

IMPORTANT QUESTIONS FOR PRACTICE CLASS - XI

ACCOUNTANCY

CHAPTER 1 : INTRODUCTION TO ACCOUNTING

Question 1

Define Accounting.

Answer: According to the American Institute of Certified Public Accountants, Accounting is, 'It is an art of recording, classifying and summarising in a significant manner and in terms of money, transactions and events, which are, in part at least, of a financial character, and interpreting the results thereof.'

Question 2

Mention 3 functions of Accounting.

Answer: Functions of accounting are,

- Maintaining complete and systematic records
- Trusteeship
- Compliance of legal needs

Question 3

Define Book-keeping.

Answer: According to J.R. Batliboi, bookkeeping is, 'Book-keeping is an art of recording business dealing in a set of books.'

Question 4

Mention 2 Differences between accounting and accountancy.

Answer:

Accounting	Accountancy
Accounting is an art of recording, classifying and summarising in a significant manner and in terms of money, transactions and events, which are, in part at least, of a financial character, and interpreting the results thereof	Accountancy is a body of knowledge prescribing definite rules to be observed while recording, classifying and summarising of transactions.
It relies on Book-keeping.	It relies on both Book-keeping and Accounting.

Question 5

Mention the types of accounting.

Answer: There are 5 types of accounting. Namely,

- Financial Accounting
- Cost Accounting
- Management Accounting

- Tax Accounting
- Social responsibility Accounting

Question 6

Who are the users of Accounting?

Answer: The users may be categorised into 2 groups. Namely,

- Internal users
- External users

Question 7

What are the 3 advantages of accounting?

Answer: Advantages of accounting are,

- Helpful in business
- Helpful in decision making
- Helpful in controlling

Question 8

What are the 5 roles of accounting?

Answer: Roles of accounting are,

- Role of language
- Role of the historical record
- Role of the service provider
- Role of information system
- Role of determining the net profit

Question 9

What is the end product of financial accounting?

Answer: End product of financial accounting is 'Financial Statements'.

Question 10

Mention 2 qualitative characteristics of accounting information.

Answer:

- Reliability
- Comparability

Question 11

External users of accounting information are not:

- Lenders
- Officers
- Employees
- Public

Answer: Officers

Question 12

Which of the following is not a sub-field of accounting?

- Financial Accounting
- Cost Accounting
- Management Accounting
- Book-keeping

Answer: Book-keeping

Question 13

What is the traditional function of accounting?

Answer: Recording of financial transactions.

Question 14

Book-keeping begins where accounting ends. True or False?

Answer: True

Question 15

Accounting is the language of business. True or False?

Answer: True

CHAPTER 2: THEORY BASE OF ACCOUNTING

Question 1

What is the meaning of Basic Accounting Terms?

Answer: There are definite basic accounting terms which are used on a daily basis in the world of business. Before recording the transactions in the books, it is required to comprehend these terms as they have their particular meaning in Accounting. These basic terms are known as Accounting Terminologies.

Question 2

How is the total amount of Capital calculated?

Answer: Capital = Assets – Liabilities

Question 3

How is the total amount of Liabilities calculated?

Answer: Liabilities = Assets – Capital

Question 4

Give 2 examples of Capital receipts.

Answer:

- The amount received by way of loans
- The amount received from the sale of fixed assets or investments

Question 5

Mention different types of liabilities.

Answer:

- Internal liabilities

- External liabilities
- Current liabilities
- Non-current liabilities

Question 6

What are the drawings?

Answer: Drawings refer to any value of commodities or cash withdrawn by the owner for personal use.

Question 7

Give 2 examples of Tangible assets.

Answer:

- Stock
- Land and Building

Question 8

The amount which the proprietor has invested in a business is known as,

Answer: Capital

Question 9

A Ltd. imported from London one machinery for sale in India and other machinery for production purpose. Will you treat them as goods or fixed assets?

Answer: First machinery will be treated as goods and the second machinery will be treated as Fixed Asset.

Question 10

What is income?

Answer: Excess of revenue over expense is called as Income.

Income = Revenue – Expenses

Question 11

What is the nature of accounting principles?

Answer: Nature of accounting principles are,

- Accounting principles are a uniform set of rules that are developed to assure the uniformity and easy comprehension of the accounting information
- Accounting principles are man made and are derived from experience and reason
- Accounting principles are not static

Question 12

What are the different bases of accounting?

Answer: Different bases of accounting are,

- Cash basis
- Accrual basis

CHAPTER 3: RECORDING OF TRANSACTIONS - I

Question 1

Define compound voucher.

Answer: Compound vouchers are those vouchers which record different single or multiple debit/credit transactions.

Question 2

Define a journal voucher.

Answer: Preparation of accounting voucher for multiple debit and credit transaction is known as a journal voucher

Question 3

Define a complex transaction.

Answer: Transactions with multiple debits and credits are called complex transactions.

Question 4

Give three elements of accounting voucher.

Answer: The three elements of accounting voucher are.

- Name of the company should be printed on the top
- The voucher number should be mentioned in the serial order
- Debit and credit amount should be written in figures against the amount

Question 5

What does accounting equation signify?

Answer: Accounting equation implies that the assets of a company are regularly equivalent to the total of its liabilities and capital (owner's equity).

Question 6

What are the two rule to follow when changing record in assets/expenses (Losses)?.

Answer: The two rules to follow while recording differences in Assets/Expenses (Losses) are.

- A rise in an asset is debited, and the drop in the asset is credited.
- A Rise in expenses/losses is debited, and the drop in expenses/ losses is credited.

Question 7

What is the two rule to follow when changing record in liabilities and capital change/Revenue(Losses)?

Answer: The two rules to follow when changing record in liabilities and capital change/Revenue(Losses) are.

- A rise in the liabilities is credited and the drop in liabilities is debited.
- A rise in the capital is credited and the drop in the capital is debited.

Question 8

State journal entries that are subdivided into a number of books of original entry

Answer: The journal is subdivided into a number of books of original entry are.

- Journal Proper
- Cashbook

- Other day books:
 - Purchases (journal) book
 - Sales (journal) book
 - Purchase Returns (journal) book
 - Sale Returns (journal) book
 - Bills Receivable (journal) book
 - Bills Payable (journal) book

Question 9

Give two differences between journal and ledger.

Answer: The two differences between journal and ledger are.

- For a transaction, journal is the initial book of entry. And the ledger is a second book of entry.
- The recording process in the journal is known as journalising. The recording process in the ledger is known as posting.

Question 10

Give two differences between journal and ledger.

Answer: The two differences between journal and ledger are.

- For a transaction, a journal is the initial book of entry. And the ledger is the second book of entry.
- The recording process in the journal is known as journalising. The recording process in the ledger is known as posting.

Question 11

Voucher is prepared for

1. Cash received and paid
2. Cash/Credit sales
3. Cash/Credit purchase
4. All of the above

Answer: All of the above

Question 12

Which of the following is correct?

1. Liabilities = Assets + Capital
2. Assets = Liabilities – Capital
3. Capital = Assets – Liabilities
4. Capital = Assets + Liabilities. Cash/Credit sales

Answer: Capital = Assets – Liabilities

Question 13

Cash withdrawn by the Proprietor should be credited to

1. Drawings account
2. Capital account

3. Profit and loss account
4. Cash account

Answer: Cash account

Question 14

Recording of a transaction in the Journal is called:

1. Casting
2. Posting
3. Journalising
4. Recording

Answer: Journalising

Question 15

How many sides does an account have?

1. Two
2. Three
3. One
4. None of These

Answer: Two

CHAPTER 4: RECORDING OF TRANSACTIONS - II

Question 1

When a firm maintains a cash book, it need not maintain

1. Journal Proper
2. Purchases (journal) book
3. Sales (journal) book
4. Bank and cash account in the ledger

Answer: Bank and cash account in the ledger

Question 2

Double column cash book records:

1. All transactions
2. Cash and bank transactions
3. Only cash transactions
4. Only credit transactions

Answer: Cash and bank transactions

Question 3

Goods purchased on cash are recorded in the

1. Purchases (journal) book

2. Sales (journal) book
3. Cash book
4. Purchases return (journal) book

Answer: Cash book

Question 4

Cash book does not record the transaction of

1. Cash nature
2. Credit Nature
3. Cash and credit nature
4. None of these

Answer: Credit Nature

Question 5

Total of these transactions is posted in purchase account

1. Purchase of furniture
2. Cash and credit purchase
3. Purchases return
4. Purchase of stationery

Answer: Cash and credit purchase

Question 6

The periodic total of sales return journal is posted to

1. Sales account
2. Goods account
3. Purchases return account
4. Sales return account

Answer: Sales return account

Question 7

The credit balance of bank account in cash book shows

1. Overdraft
2. Cash deposited in our bank
3. Cash is withdrawn from the bank
4. None of these

Answer: Cash deposited in our bank

Question 8

The periodic total of purchases return journal is posted to

1. Purchase account
2. Profit and loss account

3. Purchase returns account
4. Furniture account

Answer: Purchase returns account

Question 9

Balancing of account means

1. Total of debit side
2. Total of credit side
3. A difference in the total of debit & credit
4. None of these

Answer: A difference in the total of debit & credit

Question 10

Journal is a book of secondary entry. Is it true or false?

Answer: False

Question 11

One debit account and more than one credit account in an entry are called compound entry. Is it true or false?

Answer: True

Question 12

Assets sold on credit are entered in the sales journal. Is it true or false?

Answer: False

CHAPTER 5: BANK RECONCILIATION STATEMENT

Question 1

Define the bank reconciliation statement

Answer: Bank Reconciliation Statement is a record book of the transactions of a bank account. It reconciles the difference between the company's cash book and bank balance.

Question 2

What do you mean by a debit balance in Passbook?

Answer: The debit balance in passbook means overdraft.

Question 3

State two reasons for the difference between the company's cash book and bank balance

Answer: The two reasons for the difference between the company's cash book and bank balance

- Bank issued cheque but not yet deposited for payment
- Paid cheque in the bank but yet not cleared

Question 4

Why the bank reconciliation statement is important?

Answer: The bank reconciliation statement is important to determine the cause for the difference made on the part of the bank or customers side.

Question 5

Which balance is caused an overdraft of cash book and passbook?

Answer: Cash book Cr. and Passbook Dr. balances.

Question 6

Mention two items drafted in a plus column while starting with a debit balance of cash book.

Answer: The two items drafted in a plus column while starting with a debit balance of cash book are.

- Bank issued cheque but not yet deposited for payment
- Interest allowed by the bank but not recorded in the cash book

Question 7

Mention two items drafted in a minus column while starting with a debit balance of cash book.

Answer: The two items drafted in a minus column while starting with a debit balance of cash book are.

- Paid cheque in the bank but yet not cleared
- Bank made direct payment from the customer's side

Question 8

Mention two items drafted in a minus column while starting with a overdraft balance of cash book.

Answer: The two items drafted in a minus column while starting with an overdraft balance of cash book are.

- Paid cheque in the bank but yet not cleared
- Bank made direct payment from the customer's side

Question 9

Mention two items drafted in a plus column while starting with an overdraft balance of cash book.

Answer: The two items drafted in a plus column while starting with an overdraft balance of cash book are.

- Bank-issued cheque but not yet deposited for payment
- Interest allowed by the bank but not recorded in the cash book

Question 10

A bank reconciliation statement is

1. A part of Cash Book
2. A part of Pass Book
3. A statement prepared by the bank
4. A statement prepared by the customer

Answer: A statement prepared by the customer

Question 11

A Pass Book is a copy of

1. A customer's account in the bank's book
2. Cash book relating to bank column
3. Cash book relating to cash column
4. Firm's receipts and payments

Answer: A customer's account in the bank's book

Question 12

A bank reconciliation statement is prepared with the balance of

1. Cash book
2. Passbook
3. Either Cashbook or Pass Book
4. Neither Cashbook or Pass Book

Answer: Either Cashbook or Pass Book

Question 13

A bank reconciliation statement is prepared by

1. Bank
2. Customers of the Bank
3. Creditors
4. Auditors

Answer: Customers of the Bank

Question 14

Which of the statement is not a part of the Double Entry System

1. Cash Book
2. Trial Balance
3. Journal
4. Bank Reconciliation Statement

Answer: Bank Reconciliation Statement

Question 15

A debit balance in passbook is defined as an overdraft. Is it true or false?

Answer: True

CHAPTER 6: TRIAL BALANCE AND RECTIFICATION OF ERRORS

Question 1

Define trial balance.

Answer: A trial balance is a worksheet record book that reflects the debit and credit balance of all the registered accounts. This worksheet statement is used to prepare the final account report of the company. Trial balance also determines the accuracy of the account. However, it doesn't ensure that the account is error-free but surely gives mathematical precision.

Question 2

Explain two objectives of preparing a trial balance

Answer: The two objectives of preparing a trial balance

- To determine the financial accuracy of the ledger accounts
- To help in finding an error

Question 3

Select the correct error that is revealed by the Trial balance

1. The wrong amount entered in to book of original entry
2. The wrong amount posted in the ledger account
3. The complete omission of an entry from the book of an original entry
4. None of the above

Answer: The wrong amount posted in the ledger account

Question 4

In Trial balance which item is showed as a debit balance

1. Purchase Return
2. Outstanding Salary
3. Sales
4. Prepaid Expenses

Answer: Prepaid Expenses

Question 5

Which of the commission is not an error

1. A sale of ₹660 not recorded in a book at all
2. Rent paid to the landlord but not posted to his account
3. A purchase of ₹ 990 was wrongly recorded to sales account
4. Credited Ram instead of crediting Arjun

Answer: A sale of ₹660 not recorded in a book at all

Question 6

The trial balance is not affected by which errors?

1. Wrong balancing of an account
2. Wrong totaling of an account
3. The omission of an account from the trial balance
4. Writing of an amount in the wrong account but correct side

Answer: Writing of an amount in the wrong account but correct side

Question 7

Received ₹20,000 from Anu and credited to Paras account. It is an error of.

1. Principal

2. Omission
3. Commission
4. Compensatory

Answer: Commission

Question 8

State the error of principle from the following options.

1. The purchased book was overcast by ₹500
2. Credit sale to Arun ₹700 recorded as a purchase from Arun
3. Good returned to Chetna ₹4,000 posted in Chiru A/c
4. For installation of machinery, wages were paid to the wages A/c

Answer: For installation of machinery, wages were paid to the wages A/c

Question 10

State the error of principle from the following options.

1. The purchased book was overcast by ₹500
2. Credit sale to Arun ₹700 recorded as a purchase from Arun
3. Good returned to Chetna ₹4,000 posted in Chiru A/c
4. For installation of machinery, wages were paid to the wages A/c

Answer: For installation of machinery, wages were paid to the wages A/c

Question 11

A piece of machinery equipment was purchased for ₹10,000 which was wrongly recorded in purchase account. Due to which error?

1. Trial balance will show a difference of ₹10,000
2. Trial balance will not show any difference
3. Trial balance will show a difference of ₹20,000
4. Trial balance will show a difference of ₹5,000

Answer: Trial balance will not show any difference

Question 12

While preparing a Trial balance which error cannot be disclosed.

Answer: While preparing a Trial balance which error cannot be disclosed is.

- Error of Omission
- Error of Commission

Question 13

State one example of an error of commission

Answer: Purchase of goods for ₹5,000 entered in the purchase book as ₹500.

Question 14

Define a compensating error.

Answer: A compensating error can be defined as when one error compensates or neutralizes the other error.

Question 15

Give an example of principal error

Answer: When a purchase of furniture is debited to purchase account instead of a furniture account.

CHAPTER 7: DEPRECIATION, PROVISION AND RESERVES

Question 1

Define Depreciation.

Answer: Depreciation is defined as continuing or permanent decrease in the quantity, value, and quality of assets.

Question 2

What causes depreciation

Answer: Depreciation is caused by

- By constant use
- By the expiry of a time

Also Read: What is Depreciation?

Question 3

Give two objectives of Depreciation

Answer: The two objectives of depreciation are

- For ascertaining the true profit and loss by profit and loss account
- For showing the true financial position by the balance sheet

Question 4

State the two factors for determining the amount of depreciation

Answer: The two factors for determining the amount of depreciation are

- The total cost of the asset
- The estimated useful life of the asset

Question 5

What is the scrap value or residual of an asset?

Answer: The scrap value or residual of an asset is the estimated sale value of the assets at the end of its useful life.

Question 6

What is the formula of a depreciable cost?

Answer: Depreciable Cost = Cost of Asset – Scrap Value

Question 7

Define Provisions.

Answer: The amount retained by way of providing for any unknown liability of which the amount cannot be determined with substantial accuracy.

Question 8

State two features of Provisions.

Answer: The two features of Provisions are.

- Provision is arranged to meet a known liability
- The liability is known but the amount of these liabilities cannot be ascertained with reasonable accuracy
- Provision is a charge against profit and as such reduces the profits of the year in which it is created

Question 9

Define Reserve

Answer: Reserve refers to the amount set apart out of profit and other surpluses to meet future risks.

Question 10

If the amount of any unknown liability cannot be determined accurately

1. Provision should be created
2. Definite liability should be created
3. Reserve should be created
4. Should be shown as a contingent liability

Answer: Provision should be created

Question 11

Give one difference between reserve and provision on the basis of charge or appropriation

Answer: Reserve is an appropriation of profit and provision is a charge against profit.

Question 12

Provision is made to meet the unknown liability. Is it true or false

Answer: True

Question 13

General reserve can be used only for some specific purposes. Is it true or false

Answer: False

Question 14

Depreciation is provided only on fixed assets except for land

Answer: True

Question 15

Depreciation is non-cash expenditure

Answer: True

CHAPTER 8: BILLS OF EXCHANGE

Question 1

What are the two most used negotiable instrument

Answer: The two most used negotiable instrument is.

- Bill of exchange
- Promissory Note

Question 2

What is the bill of exchange

Answer: Bil of exchange is a written document signed by the head of the department or the makers guiding them to pay a certain amount for the order of a certain individual or the bearer of the device.

Question 3

Explain the characteristics of the bill of exchange

Answer: The characteristics of the bill of exchange are.

- A bill of exchange should be in writing
- The order must be unconditional
- The date of payment must be a fixed date
- It should be signed by the drawee of the bill
- It should be signed by the drawer of the bill

Question 4

Is bill of exchange drawn by the debtor?

Answer: No the bill of exchange is not drawn by a debtor

Question 5

Does promissory note require acceptance?

Answer: No the promissory note does not require acceptance as it is already a valuable device.

Question 6

What is the date of maturity of a bill of exchange?

Answer: The date of maturity of a bill of exchange is the date on which the bill becomes due for payment.

Question 7

What is the date of maturity of a bill of exchange? Calculate the due date of a bill of exchange written on July 13, 2017, for 30 days.

Answer: The date of maturity will be August 14, 2017.

Question 8

What is nothing of the bill of exchange?

Answer: The dishonor of the bill by the public is referred to as nothing of the bill of exchange.

Question 9

What is a bill called draft?

Answer: Before its acceptance.

Also Check: Important Questions Chapter 9 Financial Statements -1

Question 10

Liability for a discounted bill is a

1. Contingent Liability
2. Fixed Liability
3. Current Liability
4. None of the above

Answer: Contingent Liability

Question 11

Nothing charges are borne by

1. Drawer
2. Drawee
3. Payee
4. Bank

Answer: Drawee

Question 12

What account will be credited when discounted bill is dishonoured?

1. Drawer's Account
2. Drawee's Account
3. Endorsee's Account
4. Bank Account

Answer: Bank Account

Question 13

On a public holiday, the due date of a bill will be due on.

1. One day after the due date
2. Public holiday
3. One day before the due date
4. None of the above

Answer: One day before the due date

Question 14

Bill of exchange is a conditional order to pay

Answer: False

Question 15

A promissory note is drawn and signed by the debtor

Answer: True

CHAPTER 9: FINANCIAL STATEMENTS - I

Question 1

What are the financial statements?

Answer: Financial statement is a statement which presents financial profit data and financial status of a company.

Question 2

Which are the statement that is included in the financial statement?

Answer: The statement that is included in the financial statement are.

- Balance Sheet
- Trading and Profit and Loss A/c

Question 3

Which is a trading account?

Answer: A trading account is a financial statement that shows the result of the purchase and selling of goods and services of an accounting year.

Question 4

Which is gross profit?

Answer: Gross profit is the surplus of a selling price of a product over the cost of goods sold.

Question 5

State the formula to calculate operating profit from net profit.

Answer: Operating Profit = Net Profit – Non-Operating Income + Non-Operating Expenses

Question 6

State the formula to calculate the cost of goods sold.

Answer: Cost of goods sold = Sales – Gross Profit

Or

Opening Stock + Purchases + Direct Expenses – Closing Stock

Question 7

Define Balance Sheet.

Answer: A Balance Sheet is a statement which shows the liabilities, assets and shareholder's equity of the enterprise. This statement comprises of 2 major groups in which it is categorized, namely, assets, which is classified into Non – Current Assets and Current assets. Current Assets are such assets which are easily transformed into cash. On the other hand, the Non – Current Assets are such types of assets with the assistance of which the enterprise operates the enterprise.

Question 8

Give two characteristics of the balance sheet.

Answer: The two characteristics of the balance sheet are.

- Determine the financial position of the enterprise on a specific date

- The balance sheet has two sides Assets and Liabilities

Question 9

Define Net profit

Answer: Net profit refers to the surplus of all the revenues overall expenses and losses of a company.

Question 10

Give true or false. Goodwill is a tangible asset

Answer: False

Question 11

The current asset does not include closing stock

Answer: False

Question 12

A balance sheet is arranged in a particular date and not for a particular accounting period.

Answer: True

Question 13

Goodwill is

1. Current Asset
2. Tangible Asset
3. Intangible Asset
4. Fictitious Asset

Answer: Intangible Asset

Question 14

Balance of petty cash is

1. Expenses
2. Income
3. Liability
4. Asset

Answer: Asset

Question 15

The purpose of preparing a final account is to determine

1. Profit and Loss
2. Capital
3. The value of Assets
4. Profit and Loss and Financial position

Answer: Profit and Loss and Financial position

CHAPTER 10: FINANCIAL STATEMENTS - II

Question 1

What is an outstanding expense?

Answer: Outstanding expenses are those expenses which have been acquired during a given period of time but have left unpaid till the date of preparing a financial statement.

Question 2

What journal account will be passed for outstanding salary?

Answer: Salary A/c Dr.

To Outstanding Salary A/c

Question 3

What journal account will be passed for prepaid insurance?

Answer: Prepaid Insurance A/c Dr.

To Insurance A/c

Question 4

Accrued income and income due but not received are the same. Is it true or false?

Answer: True

Question 5

Which account is debited for creating a provision for doubtful debts?

Answer: Profit and Loss Account

Question 6

For doubtful debts under which accounting concept provision is made?

Answer: Prudence Concept

Question 7

Mention two examples of revenue expenditure

Answer: The two examples of revenue expenditure are

- Purchase of Goods
- Salary, Rent, etc

Question 8

In balance sheet assets side represents a debit balance

Answer: True

Question 9

Life Insurance premium is treated as drawings

Answer: True

Question 10

Bank overdraft is a contingent account

Answer: False

Question 11

Closing stock is shown in Financial statement at

1. Cost Price
2. Realisable Value
3. Cost price or Realisable value whichever is greater
4. Cost price or Realisable value whichever is less

Answer: Cost price or Realisable value whichever is less

Question 12

Accrued income is

1. A liability
2. Revenue
3. An Asset
4. An Expense

Answer: An Asset

Question 13

Type of account shown in the balance sheet is.

1. Nominal and Personal
2. Real and Nominal
3. Real and Personal
4. Real, Nominal, and Personal

Answer: Real and Personal

Question 14

If a closing stock appears in trial balance then it will be appearing in.

1. Trading Account
2. Balance Sheet
3. Profit & Loss Account
4. Trading & Balance sheet account

Answer: Balance Sheet

Question 15

Give two examples of capital expenditure.

Answer: The two examples of capital expenditure are.

- Purchase of Machinery
- Expenditure on the installation of Machinery

CHAPTER 11: ACCOUNTING FROM INCOMPLETE RECORDS

Question 1

What do you mean by Incomplete Record?

Answer: Incomplete record refers to those records which are not arranged according to the principles of double-entry.

Question 2

Give two features of Incomplete Record?

Answer: The two features of incomplete record are.

- Maintenance of personal account only
- Maintenance of cash book

Question 3

Give two reasons for keeping Incomplete Record?

Answer: The two reasons for keeping incomplete record are.

- **Convenient Method-** It is an easy and uncomplicated method of registering the company's transactions as it does not demand any individual knowledge of the principles of double-entry
- **Limited resources required –** Since only cash book and few ledger accounts are recorded in this system, the staff required for support is also smaller as compared to the double-entry system.

Question 4

Give two limitations of keeping Incomplete Record?

Answer: The two limitations of keeping incomplete record are.

- **Trial Balance preparation is not possible-** This system does not record both the debit and credit aspect of a transaction. Due to which the trial balance cannot be prepared and the accuracy of the financial transaction cannot be rectified.
- **Incomplete system-** It is incomplete because of the fact that this system does not record both the aspect of a transaction (credit & debit). Also, this system does not follow any set of rules.

Question 5

State two account maintained in an account from incomplete records.

Answer: The two account maintained in an account from incomplete records are.

- Cash account
- Personal Account

Question 6

What is the common objective of single entry system and the double-entry system?

Answer: The common objective of single entry system and double entry system is to determine the net profit or loss of the company.

Question 7

Which accounting principle is followed under single entry and also in double entry system?

Answer: Money Measurement Concept

Question 8

Which accounting principle is neglected under single entry and followed in double entry system?

Answer: Dual Aspect Concept

Question 9

Which two methods are used in determining profit and loss in a single entry system?

Answer: The two methods are used in determining profit and loss in a single entry system are.

- Statement of Affairs Method
- Conversation Method

Question 10

The single entry system account is maintained by.

1. Sole Trader
2. Company
3. Society
4. Government

Answer: Sole Trader

Question 11

Single entry system of bookkeeping is.

1. Inaccurate
2. Unsystematic
3. Unscientific
4. All of these

Answer: All of these

Question 12

When closing capital is more than opening capital, it denotes.

1. Profit
2. Loss
3. No Loss, No Profit
4. Profit, if there is no introduction of fresh capital

Answer: Profit, if there is no introduction of fresh capital

Question 13

Can a limited company maintain its account under single entry system?

Answer: No, a limited company maintain its account under single entry system

Question 14

What does it mean if closing capital is less than opening capital?

1. Profit
2. Loss
3. Loss, if there is no drawing

4. None of the above

Answer: Loss, if there is no drawing

ASSIGNMENTS

2019-20

CLASS XI

CHAPTER 1 EVOLUTION & FUNDAMENTALS OF BUSINESS

Attempt the following questions:

1. Sort the following into a business concern, employment and profession
Farmer Clerk Lawyer Doctor 1
2. Name one economic pursuit, in which expertise is required. 1
3. Identify the type of economic activity which requires specialised knowledge (a)Employment(b)Business(c)Profession(d)Trade 1
4. Dharma requires Rs 1 lakh to start his own business. In terms of business, what is this Rs 1 lakh called? 1
5. Fill in the blanks :
 - a) A hundi which is payable to the owner or a holder or bearer owner is called _____.
 - b) _____ and _____ of animals were important components of the economic life of ancient people.
 - c) _____ were prominent where skilled artisans worked & converted raw materials into finished goods.
 - d) Soaps are included under _____ type of industry. 1
6. Why business is considered as an economic activity? 3
7. Name the industry which is concerned with using the materials extracted at the primary stage to manufacturer goods either for final consumption or for further processing by other industrial companies. Explain the other two types of industries . 3
8. Profit is not only an objective of business, but it is the necessity of business also.' Do you agree with this statement? Give reasons in support of your answer. 3
9. Ankita have two buffaloes , one cow & one calf . he takes care of them & sells the milk extracted from them to people. Also , the milk which is left unsold , is used by him for producing milk products like ghee , curd & sometimes Kulfi too. He is very unpopular for his honesty & pure quality of the products . he gives entire credit of his success to his love for the animals that he has.
 - a) Which kind of business activity is he engaged in ?
 - b) Under which sectors is he working? 3

10. Ranu owns a factory. She has decided to plant one thousand trees near her factory site in order to avoid any damage to the environment. With reference to this case, which of the following business objectives is she fulfilling? a) Economic objective (b) Social objective (c) Human objective (d) Internal objective . Explain 3
11. Explain any four points which highlights the nature of business risks. 4
12. " Business is an economic activity," identify the aspect of business with which this statement is related & state four more points of this aspect.. 5
13. Jasbir is farmer . his younger brother Ajeet is a company Secretary while his sister Geeta is a nurse in a hospital. Name the economic activities in which they are engaged & differentiate among them on the basis of :
a) Nature of work b) Risk element c) Transfer of interest 6

CHAPTER 2 FORMS OF BUSINESS ORGANISATION

1. By whom are the Board of Directors elected in the Joint Stock Company. 1
2. Mention 2 necessary conditions that form a Joint Hindu Family business. 1
3. Which company has no restrictions on the transfer of shares? 1
4. Mention 2 types of trading concern in which sole proprietorship is feasible. 1
5. What is an unlimited liability? 1
6. What is a Joint Stock Company? 1
7. Mention the names of the systems that regulate the membership in Joint Hindu Family. 1
8. The sole proprietor has limited liability. Explain 3
9. In which form of business organisation are profits not shared with anyone? Explain. State one advantage of this form of business organisation 3
10. Shenoy is an old person. He is living in a small town with his wife & family . he along with his family members are engaged in a family business. They make jute bags & sell it in the nearby market . they purchase the raw material from the local market. Shenoy manages his business very well as others support him in all ways. Name the form of business organisation discussed here. State any three characteristics of the same . 4
11. Identify the form of business organisation in which decisions are made by members based on the principle 'one man , one vote' & explain any four of its merits. 5
12. Shilpa has decided to enter into a partnership with her colleague for selling customised hampers. As she is an amateur in business, please guide her regarding the features/characteristics of the partnership. (6)

CHAPTER 3. PUBLIC ,PRIVATE, GLOBAL ENTERPRISES

1. Departmental undertakings are suitable in case of _____.

- a) Commercial undertaking b) industrial undertaking c) national security d) infrastructural 1
2. Which one of the following Do Not justify the objective of establishing public sector enterprises?
- a) To achieve regional balance
b) To achieve economic growth
c) To achieve economies of scale
d) To achieve nuclear power development in the country 1
3. Name the organisation established by passing a special Act of parliament. 1
4. What are the different types of PSEs? 1
5. Mention the types of business enterprise which operates in more than 1 nation. 1
6. What are the objectives of a public sector enterprise? 3
7. You must have consumed soft drinks like Coca Cola & Pepsi. State any three features of such types of companies. 3
8. Parking in central Kolkata , the heart of this mega city, has always been a hassel. This is the case with most of the inner city areas. In attempt to address the situation , the Kolkata Municipal Corporation (KMC) decided to utilise the rights to underground space & undertake the parking project with private parties – KMC & simplex. The purpose of the project was to develop an underground parking system.
- a) Name & state the type of enterprise referred to in the above para.
b) State its three features. 4
9. Tata sons & Singapore airlines has started jointly Vistara Airlines , an Indian domestic airline based in Gurugram for the common purpose of business expansion.
- a) Identify the kind of arrangement under which the two firms formed Vistara Airlines.
b) Explain any four of its benefits. 5
10. Chennai Pharmaceuticals Co. Ltd. Registered under the companies Act2013 was started with a paid-up capital of Rs. 50,00,000 . 40% of this paid up capital is in the hands of private individuals & the balance is held by government of Chennai. Chennai Pharmaceuticals Co. Ltd. Belongs to which form of public sector enterprise, state its two features & two demerits . 6

CHAPTER 4 BUSINESS SERVICES

1. Deepak a textile dealer wants to know the non- insurable risk from the following. Can you help him to identify it?
- A) Fire b) theft c) Marine perils d) change in fashion 1
2. Which of the following is not included in electronic services?
- a) Correspondence b) fax c) internet d) E-mail 1
3. State whether the following statements are 'true' or 'false' :
- a) Money can be withdrawn from fixed deposit accounts by cheques.

- b) Current account is most suitable for the mobilisation of savings of the public.
- c) The banks do not pay any interest on saving account deposit. 1
4. DTH services are provided by _____.
5. “ The insured must have an interest in the subject matter of insurance.” Which principal of insurance is referred to in this statement?
6. Explain the acceptance of deposits function & leading function of commercial bank. 3
7. Ram took insurance policy for his car. In an accident his car totally damaged. Insure paid the fully policy value to the insured. Ram has sold his car as scarp for Rs.50000. is he correct ? identify & explain the insurance principle violated in this case. 3
8. Mr. Akshit gets his factory insured against fire of Rs.40 lakh with insurer A & 10nlakh insurer B. A loss of Rs.5 lakh occurred.
- a) How much compensation can be claimed from A & B separately & why? Name the principle of insurance highlighted in the above case.
- b) The residues of the factory were sold for Rs. 15000. Who will rightly avail the amount & why? 4
9. State the difference between fire insurance & marine insurance on any six basis. 6
- He insured has taken a policy from two insurers. On suffering loss, Rs 1,00,000 as compensation needs to be given to the insured. Both insurers will equally distribute the amount among them, i.e. Rs50,000 each, and compensate the insured.
- (a)Which principle of insurance is highlighted here?
- (b)Explain the principle identified in part (a) 4
- 10.“ The Departments of posts of the government of India provides service related to remittance of money through money orders & postal orders.’ Explain any five services of this type. 5
11. Every human being faces uncertainties and risks in day-to-day activities. Hence, insurance is necessary for all. It is a means of providing compensation against loss incurred due to natural or man-made factors. In light of these statements, explain the various principles of insurance. (6)

CHAPTER 5 EMERGING MODES OF BUSINESS

1. The term Virus stands for _____. 1
2. The online payment of telephone bills comes under the _____ model of e-commerce.
- a) B2B b) C2C c) B2C d) intra -B 1
3. Which one of the following is not an example of transactional risk?
- a) Default on order taking b) hacking c) default on payment d) default on delivery 1
4. Which one of the following is NOT an disadvantage of outsourcing ?
- a) Sweat shopping b) Ethical concerns c) confidentiality d) quest for excellence 1

5. 'it refers to contracting out the activities the require greater skill, knowledge , education & expertise to handle ," which of the following concept is referred in above statement?
a) BPO B) KPO C) Smart card d) Credit card 1
6. Edit Law is a firm which is engaged in manufacturing law journals. Due to the growing demand for its journals ,it has handed over its research work to Right Ltd. What kind of business is being carried out by Right Ltd.?
(a)Leasing(b)Business Process Outsourcing(c)Franchising(d)Knowledge Process Outsourcing 1
7. Vijay wanted to sell his motorbike but could not get any buyer. On his friend's suggestion he posted his motorbike image for sale on olx.com & found a buyer within three days. Name the type of e-business. Explain it. 3
8. ABC Ltd. Outsources several services like advertisement , factoring , courier from outside the business while XYZ Ltd. Is also getting some services like research & Development, intellectual property right , Animation & Technical & Networking analysis.
a) State whether the services being outsourced by both the companies are of the same class.
b) If not , clarify the difference between these two class of services. 3
9. Discuss the limitations of electronic mode of doing business. Are these limitations severe enough to restrict its scope? Give reasons your answer. 4
10. Anita was interested in establishing a business after her studies. However, after a discussion with various friends, she received mixed reviews regarding setting up of a traditional business and e-business. Help her in understanding the difference between them so that she gets a clear idea to choose the better one. 5
11. Why are e-business & outsourcing referred to as the emerging modes of business? Discuss the factors responsible for the growing importance of these trends. 6

CHAPTER 6 SOCIAL RESPOSIBILITY OF BUSINESS & BUSINESS ETHICS

1. A company abides by the new regulations regarding payment of taxes in India. It is performing its social responsibility towards:
(a)The government (b)Citizens (c)Consumers (d)Workers 1
2. Which of the following are the categories of social responsibility?
a) Economic responsibility b) Ethical responsibility c) legal responsibility d) all of the above 1
3. 'It includes behaviour of the firm expected by the society but not codified by law .' identify the category of social responsibility referred here.
a) Economic responsibility b) ethical responsibility c) legal responsibility d) all of the_above 1
4. Complete the series based on the hint given:

Charging reasonable price goods & services : economic responsibility pay tax honestly: _____ . 1

5. Business ethics is important for: _____
 - a) Top level management
 - b) middle level management
 - c) lower level management
 - d) all of them. 1
6. Lamba limited deals in health drinks. It is found that there are components of pesticides in their drinks. Identify which two kinds of responsibility are missing from this approach. 3
7. A BPO is providing 24* 7 handling of customers queries & grievances. But in this process, it is making its employees work for 16 hours a day. They are not even provided a rest of more than 30 minutes in a day.
 - a) What is outsourcing?
 - b) Which responsibility is not being taken care of by the BPO?
 - c) Interest of which group are not being catered to here? 3
8. How is social responsibility of business different from legal responsibility? 3
9. “ There is a strong case for the business to fulfil its social obligations” give four reasons in support of your answers. 4
10. Strategy Ltd. Is a company deals in manufacturing , sale & exchange of medicines. The workers of this company always fall ill due to unhealthy working conditions. The company is also in the habit of providing incomplete information to its stakeholders & consumers
 - a) Identify two interest groups towards whom strategy ltd. Is not fulfilling its social responsibility by quoting.
 - b) Also state any one value not followed by the Strategy Ltd. 5
11. What is environmental pollution ? why do the enterprise need to adopt pollution control measures? Give four reasons. 6

CHAPTER 7 SOURCES OF BUSINESS FINANCE

1. The funds required by ‘Snapdeal’ to advertise in the newspaper is an example of
 - a) Ploughing back of profits
 - b) trade credit
 - c) fixed capital requirement
 - d) working capital requirements 1
2. Which of the following source of finance refers to raising funds by issuing _____ to its citizen by a company in USA?
 - a) IDR
 - b) ICD
 - c) GDR
 - d) ADR 1
3. The capital of the company divided into number of parts each of which are called
 - a) dividend
 - b) profit
 - c) interest
 - d) share 1
4. Name any two factors affecting the amount of fixed capital of a business. 1
5. Why share capital is known as owned funds? 1
6. “ As a source of finance , retained profits is better than other source of finance. Write any three reasons to support your answer. 3

7. ABC Ltd is not having good liquidity position. It has invested in long term investment projects & will get smooth cash flow after five years. It is not in the position to bear risk of fixed burden of paying interest.
 - a) Suggest a source of owners fund suitable in above case.
 - b) State any two advantages of this source. 3
8. A company requires funds to meet its working requirements . discuss any four advantages of public deposit for this purpose. 4
9. Lease financing is gaining popularity in providing important means of modernisation & diversification to business firms. In the light of the above statement, explain any five merits of lease financing as a source of finance. 5
10. Why equity share capital is known as risk capital? explain any two merits & three demerits of issuing equity shares to raise capital . 6
11. Name the method of funding start-ups wherein professionally managed funds are invested in companies
12. Kunal saw his father eagerly watching the news on TV. He asked his father why he was so focused on the news today. Kunal's father told him that the news was related to the stock market as he had invested in some shares. However, Kunal could not understand anything that his father explained about shares. Can you explain to Kunal what shares are and name any two types of shares? 3

Chapter 1- **THE LIVING WORLD**

Multiple Choice Questions

1. As we go from species to kingdom in a taxonomic hierarchy, the number of common characteristics
 - a. Will decrease
 - b. Will increase
 - c. Remain same
 - d. May increase or decrease
2. Which of the following 'suffixes' used for units of classification in plants indicates a taxonomic category of 'family'.
 - a. – Ales
 - b. – Onae
 - c. – Aceae
 - d. – Ae
3. The term 'systematics' refers to:
 - a. Identification and classification of plants and animals
 - b. Nomenclature and identification of plants and animals
 - c. Diversity of kinds of organisms and their relationship
 - d. Different kinds of organisms and their classification

4. Genus represents
 - a. An individual plant or animal
 - b. A collection of plants or animals
 - c. Group of closely related species of plants or animals
 - d. None of these
5. The taxonomic unit 'Phylum' in the classification of animals is equivalent to which hierarchical level in classification of plants
 - a. Class
 - b. Order
 - c. Division
 - d. Family
6. Botanical gardens and zoological parks have
 - a. Collection of endemic living species only
 - b. Collection of exotic living species only
 - c. Collection of endemic and exotic living species
 - d. Collection of only local plants and animals
7. Taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of
 - a. Monographs
 - b. Flora
 - c. Both a & b
 - d. None of these
8. All living organisms are linked to one another because
 - a. They have common genetic material of the same type
 - b. They share common genetic material but to varying degrees
 - c. All have common cellular organization
 - d. All of above
9. Which of the following is a defining characteristic of living organisms?
 - a. Growth
 - b. Ability to make sound
 - c. Reproduction
 - d. Response to external stimuli

10. Match the following and choose the correct option:

- | | |
|------------|------------------|
| A. Family | i. tuberosum |
| B. Kingdom | ii. Polymoniales |
| C. Order | iii. Solanum |
| D. Species | iv. Plantae |
| E. Genus | v. Solanacea |

11. Options

- a. i-D, ii-C, iii-E, iv-B, v-A
- b. i-E, ii-D, iii-B, iv-A, v-C
- c. i-D, ii-E, iii-B, iv-A, v-C
- d. i-E, ii-C, iii-B, iv-A, v-D

Very Short Answer Type Questions

1. Linnaeus is considered as Father of Taxonomy. Name two other botanists known for their contribution to the field of plant taxonomy?
2. What does ICZN stand for?
3. Couplet in taxonomic key means _____ .
4. What is a Monograph?
5. Amoeba multiplies by mitotic cell division. Is this phenomena growth or reproduction? Explain.
6. Define metabolism.
7. Which is the largest botanical garden in the world? Name a few well known botanical gardens in India.

Short Answer Type Questions

1. A ball of snow when rolled over snow increases in mass, volume and size. Is this comparable to growth as seen in living organisms? Why?
2. In a given habitat we have 20 plant species and 20 animal species. Should we call this as 'diversity' or 'biodiversity'? Justify your answer.
3. International Code of Botanical nomenclature (ICBN) has provided a code for classification of plants. Give hierarchy of units of classification botanists follow while classifying plants and mention different 'Suffixes' used for the units.
4. A plant species shows several morphological variations in response to altitudinal gradient. When grown under similar conditions of growth, the morphological variations disappear and all the variants have common morphology. What are these variants called?
5. How do you prepare your own herbarium sheets? What are the different tools you carry with you while collecting plants for the preparation of a herbarium? What information should a preserved plant material on the herbarium sheet provide for taxonomical studies?
6. What is the difference between flora, fauna and vegetation? Eichornia crassipes is called as an exotic species while Rauvolfia serpentina is an endemic species in India. What do these terms exotic and endemic refer to?
7. A plant may have different names in different regions of the country or world. How do botanists solve this problem?
8. Brinjal and potato belong to the same genus Solanum, but to two different species. What defines them as separate species?
9. Properties of cell organelles are not always found in the molecular constituents of cell organelles. Justify.
10. The number and kinds of organism is not constant. How do you explain this statement?

Long Answer Type Questions

1. What is meant by living? Give any four defining features of life forms.

2. A scientist has come across a plant which he feels is a new species. How will he go about its identification, classification and nomenclature.
3. *Brassica Campestris* linn
 - a. Give the common name of the plant.
 - b. What do the first two parts of the name denote?
 - c. Why are they written in italics?
 - d. What is the meaning of linn written at the end of the name?
4. What are taxonomical aids? Give the importance of herbaria and museums. How are Botanical gardens and Zoological parks useful in conserving biodiversity?
5. Define a taxon. What is meant by taxonomic hierarchy. Give a flow diagram from the lowest to highest category for a plant and an animal. What happens to the number of individuals and number of shared characters as we go up the taxonomical hierarchy?
6. A student of taxonomy was puzzled when told by his professor to look for a key to identify a plant. He went to his friend to clarify what 'Key' the professor was referring to? What would the friend explain to him?
7. Metabolism is a defining feature of all living organisms without exception. Isolated metabolic reactions in vitro are not living things but surely living reactions. Comment.
8. Do you consider a person in coma-living or dead?
9. What is the similarity and dissimilarity between "whole moong daal" and "broken moong daal" in terms of respiration and growth? Based on these parameters classify them into living or nonliving?
10. Some of the properties of tissues are not the constituents of its cells. Give three examples to support the statement.

Chapter 2- **BIOLOGICAL CLASSIFICATION**

Multiple Choice Questions

1. All eukaryotic unicellular organisms belong to
 - a. Monera
 - b. Protista
 - c. Fungi
 - d. Bacteria
2. The five kingdom classification was proposed by

- a. R.H. Whittaker
 - b. C.Linnaeus
 - c. A. Roxberg
 - d. Virchow
3. Organisms living in salty areas are called as
- a. Methanogens
 - b. Halophiles
 - c. Heliophytes
 - d. Thermoacidophiles
4. Naked cytoplasm, multinucleated and saprophytic are the characteristics of
- a. Monera
 - b. Protista
 - c. Fungi
 - d. Slime molds
5. An association between roots of higher plants and fungi is called
- a. Lichen
 - b. Fern
 - c. Mycorrhiza
 - d. BGA
6. A dikaryon is formed when
- a. Meiosis is arrested
 - b. The two haploid cells do not fuse immediately
 - c. Cytoplasm does not fuse
 - d. None of the above
7. Contagium vivum fluidum was proposed by
- a. D.J. Ivanowsky
 - b. M.W. Beijerinck
 - c. Stanley
 - d. Robert Hook
8. Mycobiont and Phycobiont are found in
- a. Mycorrhiza
 - b. Root
 - c. Lichens
 - d. BGA
9. Difference between Virus and Viroid is
- a. Absence of protein coat in viroid but present in virus
 - b. Presence of low molecular weight RNA in virus but absent in viroid
 - c. Both a and b
 - d. None of the above

10. With respect to fungal sexual cycle, choose the correct sequence of events
- a. Karyogamy, Plasmogamy and Meiosis
 - b. Meiosis, Plasmogamy and Karyogamy
 - c. Plasmogamy, Karyogamy and Meiosis
 - d. Meiosis, Karyogamy and Plasmogamy
11. Viruses are non-cellular organisms but replicate themselves once they infect the host cell. To which of the following kingdom do viruses belong to?
- a. Monera
 - b. Protista
 - c. Fungi
 - d. None of the above
12. Members of phycomycetes are found in
- i. Aquatic habitats
 - ii. On decaying wood
 - iii. Moist and damp places
 - iv. As obligate parasites on plants
13. Choose from the following options
- a. None of the above
 - b. i and iv
 - c. ii and iii
 - d. All of the above

Very Short Answer Type Questions

1. What is the principle underlying the use of cyanobacteria in agricultural fields for crop improvement?
2. Suppose you accidentally find an old preserved permanent slide without a label. In your effort to identify it, you place the slide under microscope and observe the following features :-
 - a. Unicellular
 - b. Well defined nucleus
 - c. Biflagellate—one flagellum lying longitudinally and the other transversely.What would you identify it as? Can you name the kingdom it belongs to?
3. How is the five-kingdom classification advantageous over the twokingdom classification?
4. Polluted water bodies have usually very high abundance of plants like Nostoc and Oscillitoria. Give reasons.
5. Are chemosynthetic bacteria-autotrophic or heterotrophic?
6. The common name of pea is simpler than its botanical (scientific) name *Pisum sativum*. Why then is the simpler common name not used instead of the complex scientific/ botanical name in biology?
7. A virus is considered as a living organism and an obligate parasite when inside a host cell. But virus is not classified along with bacteria or fungi. What are the characters of virus that are similar to non-living objects?
8. In the five kingdom system of Whittaker, how many kingdoms are eukaryotes?

Short Answer Type Questions

1. Diatoms are also called as 'pearls of ocean', why? What is diatomaceous earth?

2. There is a myth that immediately after heavy rains in forest, mushrooms appear in large number and make a very large ring or circle, which may be several metres in diameter. These are called as 'Fairy rings'. Can you explain this myth of fairy rings in biological terms?
3. Neurospora – an ascomycetes fungus has been used as a biological tool to understand the mechanism of plant genetics much in the same way as Drosophila has been used to study animal genetics. What makes Neurospora so important as a genetic tool?
4. Cyanobacteria and heterotrophic bacteria have been clubbed together in Eubacteria of kingdom Monera as per the "Five Kingdom Classification" even though the two are vastly different from each other. Is this grouping of the two types of taxa in the same kingdom justified? If so, why?
5. At a stage of their cycle, ascomycetes fungi produce the fruiting bodies like apothecium, perithecium or cleistothecium. How are these three types of fruiting bodies different from each other?
6. What observable features in Trypanosoma would make you classify it under kingdom Protista?
7. Fungi are cosmopolitan, write the role of fungi in your daily life.

Long Answer Type Questions

1. Algae are known to reproduce asexually by variety of spores under different environmental conditions. Name these spores and the conditions under which they are produced.
2. Apart from chlorophyll, algae have several other pigments in their chloroplast. What pigments are found in blue-green, red and brown algae that are responsible for their characteristic colours?
3. Make a list of algae and fungi that have commercial value as source of food, chemicals, medicines and fodder.
4. 'Peat' is an important source of domestic fuel in several countries. How is 'peat' formed in nature?
5. Biological classification is a dynamic and ever evolving phenomenon which keeps changing with our understanding of life forms. Justify the statement taking any two examples.

Chapter 3- **PLANT KINGDOM**

Multiple Choice Questions

1. Cyanobacteria are classified under
 - a. Protista
 - b. Plantae
 - c. Monera
 - d. Algae
2. Fusion of two gametes which are dissimilar in size is termed as
 - a. Oogamy
 - b. Isogamy
 - c. Anisogamy
 - d. Zoogamy
3. Holdfast, stipe and frond constitutes the plant body in case of
 - a. Rhodophyceae
 - b. Chlorophyceae
 - c. Phaeophyceae

- d. All of the above
4. A plant shows thallus level of organization. It shows rhizoids and is haploid. It needs water to complete its life cycle because the male gametes are motile. Identify the group to which it belongs to
- a. Pteridophytes
 - b. Gymnosperms
 - c. Monocots
 - d. Bryophytes
5. A Prothallus is
- a. A structure in pteridophytes formed before the thallus develops
 - b. A sporophytic free living structure formed in pteridophytes
 - c. A gametophyte free living structure formed in pteridophytes
 - d. A primitive structure formed after fertilization in pteridophytes
6. Plants of this group are diploid and well adapted to extreme conditions. They grow bearing sporophylls in compact structures called cones. The group in reference is
- a. Monocots
 - b. Dicots
 - c. Pteridophytes
 - d. Gymnosperms
7. The embryo sac of an Angiosperm is made up of
- a. 8 cells
 - b. 7 cells and 8 nuclei
 - c. 8 nuclei
 - d. 7 cells and 7 nuclei
8. If the diploid number of a flowering plant is 36. What would be the chromosome number in its endosperm
- a. 36
 - b. 18
 - c. 54
 - d. 72
9. Protonema is
- a. Haploid and is found in mosses
 - b. Diploid and is found in liverworts
 - c. Diploid and is found in pteridophytes
 - d. Haploid and is found in pteridophytes
10. The giant Redwood tree (*Sequoia sempervirens*) is a/an
- a. Angiosperm
 - b. Free fern
 - c. Pteridophyte
 - d. Gymnosperm

Very Short Answer Type Questions

1. Food is stored as Floridean starch in Rhodophyceae. Mannitol is the reserve food material of which group of algae?
2. Give an example of plants with
 - a. Haplontic life cycle
 - b. Diplontic life cycle
 - c. Haplo- diplontic life cycle
3. The plant body in higher plants is well differentiated and well developed. Roots are the organs used for the purpose of absorption. What is the equivalent of roots in the less developed lower plants?
4. Most algal genera show haplontic life style. Name an alga which is
 - a. Haplo-diplontic
 - b. Diplontic
5. In Bryophytes male and female sex organs are called _____ and _____.

Short Answer Type Questions

1. Why are bryophytes called the amphibians of the plant kingdom?
2. The male and female reproductive organs of several pteridophytes and gymnosperms are comparable to floral structures of angiosperms. Make an attempt to compare the various reproductive parts of pteridophytes and gymnosperms with reproductive structures of angiosperms.
3. Heterospory i.e., formation of two types of spores – microspores and megaspores is a characteristic feature in the life cycle of a few members of pteridophytes and all spermatophytes. Do you think heterospory has some evolutionary significance in plant kingdom?
4. How far does Selaginella one of the few living members of lycopodiales (pteridophytes) fall short of seed habit.
5. Each plant or group of plants has some phylogenetic significance in relation to evolution : Cycas, one of the few living members of gymnosperms is called as the ‘relic of past’. Can you establish a phylogenetic relationship of Cycas with any other group of plants that justifies the above statement?
6. The heterosporous pteridophytes show certain characteristics, which are precursor to the seed habit in gymnosperms. Explain.
7. Comment on the lifecycle and nature of a fern prothallus.
8. How are the male and female gametophytes of pteridophytes and gymnosperms different from each other?
9. In which plant will you look for mycorrhiza and corolloid roots? Also explain what these terms mean.

Long Answer Type Questions

1. Gametophyte is a dominant phase in the life cycle of a bryophyte. Explain.
2. With the help of a schematic diagram describe the haplo-diplontic life cycle pattern of a plant group.
3. Lichen is usually cited as an example of ‘symbiosis’ in plants where an algal and a fungal species live together for their mutual benefit. Which of the following will happen if algal and fungal partners are separated from each other?
 - a. Both will survive and grow normally and independent from each other.
 - b. Both will die
 - c. Algal component will survive while the fungal component will die.
 - d. Fungal component will survive while algal partner will die.
 Based on your answer how do you justify this association as symbiosis.

4. Explain why sexual reproduction in angiosperms is said to take place through double fertilization and triple fusion. Also draw a labelled diagram of embryo sac to explain the phenomena.
5. Draw labelled diagrams of
 - a. Female and male thallus of a liverwort.
 - b. Gametophyte and sporophyte of Funaria.
 - c. Alternation of generation in Angiosperm.

Chapter 4- ANIMAL KINGDOM

Multiple Choice Questions

1. In some animal groups, the body is found divided into compartments with at least some organs/ organ repeated. This characteristic feature is named
 - a. Segmentation
 - b. Metamerism
 - c. Metagenesis
 - d. Metamorphosis
2. Given below are types of cells present in some animals. Each one is specialized to perform a single specific function except
 - a. Choanocytes
 - b. Interstitial cells
 - c. Gastrodermal cells
 - d. Nematocytes
3. Which one of the following sets of animals share a four chambered heart?
 - a. Amphibian, Reptiles, Birds
 - b. Crocodiles, Birds, Mammals
 - c. Crocodiles, Lizards, Turtles
 - d. Lizards, Mammals, Birds
4. Which of the following pairs of animals has non glandular skin
 - a. Snake and Frog
 - b. Chameleon and Turtle
 - c. Frog and Pigeon
 - d. Crocodile and Tiger
5. Birds and mammals share one of the following characteristics as a common feature.

- a. Pigmented skin
 - b. Alimentary canal with some modification
 - c. Viviparity
 - d. Warm blooded nature
6. Which one of the following sets of animals belong to a single taxonomic group?
- a. Cuttlefish, Jellyfish, Silverfish, Dogfish, Starfish
 - b. Bat, Pigeon, Butterfly
 - c. Monkey, Chimpanzee, Man
 - d. Silkworm, Tapeworm, Earthworm
7. Which one of the following statements is incorrect?
- a. Mesoglea is present in between ectoderm and endoderm in Obelia.
 - b. Radial symmetry is found in Asterias
 - c. Fasciola is a pseudocoelomate animal
 - d. Taenia is a triploblastic animal
8. Which one of the following statements is incorrect?
- a. In cockroaches and prawns excretion of waste material occurs through malpighian tubules.
 - b. In ctenophors, locomotion is mediated by comb plates.
 - c. In Fasciola flame cells take part in excretion
 - d. Earthworms are hermaphrodites and yet cross fertilization take place among them.
9. Which one of the following is oviparous?
- a. Platypus
 - b. Flying fox (Bat)
 - c. Elephant
 - d. Whale
10. Which one of the following is not a poisonous snake?
- a. Cobra
 - b. Viper
 - c. Python
 - d. Krait

11. Match the following list of animals with their level of organisation.

Division of Labour	Animal
A. Organ level	i. Pheritima
B. Cellular agregate level	ii. Fasciola
C. Tissue level	iii. Spongilla
D. Organ system level	iv. Obelia

12. Choose the correct match showing division of labour with animal example.

- a. i-B, ii-C, iii-D, and iv-A
- b. i-B, ii-D, iii-C, and iv-A
- c. i-D, ii-A, iii-B, and iv-C
- d. i-A, ii-D, iii-C, and iv-B

13. Body cavity is the cavity present between body wall and gut wall. In some animals the body cavity is not lined by mesoderm. Such animals are called

- a. Acoelomate
- b. Pseudocoelomate
- c. Coelomate
- d. Haemocoelomate

14. Match the column A with column B and choose the correct option

Column A

Column B

A. Porifera

i. Canal system

B. Aschelminthes

ii. Water-vascular system

C. Annelida

iii. Muscular Pharynx Comb plates

D. Arthropoda

iv. Jointed appendages

E. Echinodermata

v. Metameres

- a. A-ii, B-iii, C-v, D-iv, E-i
- b. A-ii, B-v, C-iii, D-iv, E-i
- c. A-i, B-iii, C-v, D-iv, E-ii
- d. A-i, B-v, C-iii, D-iv, E-ii

Very Short Answer Type Questions

1. Identify the phylum in which adults exhibit radial symmetry and larva exhibit bilateral symmetry.
2. What is the importance of pneumatic bones and air sacs in Aves?
3. What is metagenesis? Mention an example which exhibits this phenomenon.
4. What is the role of feathers?
5. Which group of chordates possess sucking and circular mouth without jaws?
6. Give one example each for an animal possessing placoid scales and that with cycloid scales.
7. Mention two modifications in reptiles required for terrestrial mode of life.
8. Mention one example each for animals with chitinous exoskeleton and those covered by a calcareous shell.
9. What is the role of radula in molluscs?
10. Name the animal, which exhibits the phenomenon of bioluminescence. Mention the phylum to which it belongs.
11. Write one example each of the following in the space provided.
 - a. Cold blooded animal _____
 - b. Warm blooded animal _____

- c. Animal possessing dry and cornified skin _____
 - d. Dioecious animal _____
12. Differentiate between a diploblastic and a triploblastic animal.
13. Give an example of the following
- a. Round worm
 - b. Fish possessing poison sting
 - c. A limbless reptile/ amphibian
 - d. An oviparous mammal
14. Provide appropriate technical term in the space provided.
- a. Blood-filled cavity in arthropods _____.
 - b. Free-floating form of cnidaria _____.
 - c. Stinging organ of jelly fishes _____.
 - d. Lateral appendages in aquatic annelids _____.
15. Match the following:

Animals	locomotory Organ
a. Octopus	i. Limbs
b. Crocodile	ii. Comb plates
c. Catla	iii. Tentacles
d. Ctenoplana	iv. Fins

Short Answer Type Questions

1. Differentiate between:
 - a. Open circulatory system and closed circulatory system
 - b. Oviparous and viviparous characteristic
 - c. Direct development and Indirect development
2. Sort out the animals on the basis of their symmetry (radial or bilateral) coelenterates, ctenophores, annelids, arthropods, and echinoderms.
3. There has been an increase in the number of chambers in heart during evolution of vertebrates. Give the names of the class of vertebrates having two, three or four-chambered heart.
4. Fill up the blank spaces appropriately

Phylum/Class	Excretory Organ	Circulatory Organ	Respiratory Organ
Arthropoda		Lungs/ Gills/Tracheal System	
	Nephridia	Closed	

	Metanephridia	Open	Skin/parapodia
Amphibia	Closed	Lung	

5. Match the following

- | | |
|-------------------|--|
| a. Amphibia | i. Air bladder |
| b. Mammals | ii. Cartilaginous notochord |
| c. Chondrichthyes | iii. Mammary glands |
| d. Ostichthyes | iv. Pneumatic bones |
| e. Cyclostomata | v. Dual habitat |
| f. Aves | vi. Sucking and circular mouth without jaws. |

6. Endoparasites are found inside the host body. Mention the special structure, possessed by these and which enables them to survive in those conditions.

7. Match the following and write correct choice in space provided

- | Animal | Characteristics |
|--------------|-----------------------|
| a. Pila | i. Jointed appendages |
| b. Cockroach | ii. Perching |
| c. Asterias | iii. Water vascular |
| d. Torpedo | iv. electric organ |
| e. Parrot | v. Presence of shell |
| f. Dog fish | vi. Placoid scales |

8. a. _____, b. _____, c. _____
d. _____, e. _____, f. _____

9. Differentiate between:

- a. Open and closed circulatory system
- b. Oviparity and viviparity
- c. Direct and indirect development
- d. Aceolomate and pseudo coelomate
- e. Notochord and nerve cord
- f. Polyp and medusa

10. Give the characteristic features of the following citing one example of each

- a. Chondrichthyes and ostichthyes
- b. Urochordata and cephalochordata

11. Mention two similarities between

- a. Aves and mammals
- b. A frog and crocodile
- c. A turtle and pila

12. Name

- a. A limbless animal
- b. A cold blooded animal
- c. A warm blooded animal
- d. An animal possessing dry and cornified skin
- e. An animal having canal system and spicules
- f. An animal with cnidoblasts

13. Give an example for each of the following

- a. A viviparous animal
- b. A fish possessing a poison sting
- c. A fish possessing an electric organ
- d. An organ, which regulates buoyancy
- e. Animal, which exhibits alternation of generation
- f. Oviparous animal with mammary gland

14. Excretory organs of different animals are given below. Choose correctly and write in the space provided.

Animal	Characteristics
a. Pila	i. Jointed appendages
b. Cockroach	ii. Perching
c. Asterias	iii. Water vascular
d. Torpedo	iv. electric organ
e. Parrot	v. Presence of shell
f. Dog fish	vi. Placoid scales

15. a. _____, b. _____, c. _____
d. _____, e. _____, f. _____

Long Answer Type Questions

1. Give three major differences between chordates and non-chordates and draw a schematic sketch of a chordate showing those features.

2. What is the relationship between germinal layers and the formation of body cavity in case of coelomate, acoelomates and pseudocoelomates?
3. Comment upon the habitats and external features of animals belonging to class, amphibia and reptilia.
4. Mammals are most adapted among the vertebrates. Elaborate.

Chapter 5-

MORPHOLOGY OF FLOWERING PLANTS

Multiple Choice Questions

1. Rearrange the following zones as seen in the root in vertical section and choose the correct option.
A. Root hair zone
B. Zone of meristems
C. Rootcap zone
D. Zone of maturation
E. Zone of elongation
Options:
 - a. C, B, E, A, D
 - b. A, B, C, D, E
 - c. D, E, A, C, B
 - d. E, D, C, B, A
2. In an inflorescence where flowers are borne laterally in an acropetal succession, the position of the youngest floral bud shall be
 - a. Proximal
 - b. Distal
 - c. Intercalary
 - d. Any where
3. The mature seeds of plants such as gram and peas, possess no endosperm, because
 - a. These plants are not angiosperms
 - b. There is no double fertilization in them
 - c. Endosperm is not formed in them
 - d. Endosperm gets used up by the developing embryo during seed development
4. Roots developed from parts of the plant other than radicle are called
 - a. Taproots

- b. Fibrous roots
 - c. Adventitious roots
 - d. Nodular roots
5. Venation is a term used to describe the pattern of arrangement of
- a. Floral organs
 - b. Flower in inflorescence
 - c. Veins and veinlets in a lamina
 - d. All of them
6. Endosperm, a product of double fertilization in angiosperms is absent in the seeds of
- a. Gram
 - b. Orchids
 - c. Maize
 - d. Castor
7. Many pulses of daily use belong to one of the families below (tick the correct answer)
- a. Solanaceae
 - b. Fabaceae
 - c. Liliaceae
 - d. Poaceae
8. The placenta is attached to the developing seed near the
- a. Testa
 - b. Hilum
 - c. Micropyle
 - d. Chalaza
9. Which of the following plants is used to extract the blue dye?
- a. Trifolium
 - b. Indigofera
 - c. Lupin
 - d. Cassia

10. Match the followings and choose correct option

A.	Group A Aleurone layer		i.	Group B without fertilization
B.	Parthenocarpic fruit		ii.	Nutrition
C.	Ovule		iii.	Double fertilization
D.	Endosperm		iv.	Seed

Very Short Answer Type Questions

1. Roots obtain oxygen from air in the soil for respiration. In the absence or deficiency of O_2 , root growth is restricted or completely stopped. How do the plants growing in marshlands or swamps obtain their O_2 required for root respiration?

2. Write floral formula for a flower which, is bisexual; actinomorphic; sepals five, twisted aestivation, petals five; valvate aestivation; stamens six; ovary trilocarpellary, syncarpous, superior, trilobular with axile placentation.
3. In *Opuntia* the stem is modified into a flattened green structure to perform the function of leaves (i.e., photosynthesis). Cite some other examples of modifications of plant parts for the purpose of photosynthesis.
4. In swampy areas like the Sunderbans in West Bengal, plants bear special kind of roots called _____ .
5. In aquatic plants like *Pistia* and *Eichhornia*, leaves and roots are found near _____ .
6. Reticulate and parallel venation are characteristic of _____ and _____ respectively.
7. Which parts in ginger and onion are edible?
8. In epigynous flower, ovary is situated below the _____ .
9. Add the missing floral organs of the given floral formula of Fabaceae.
br $\oplus K_5$ _____ $A_{(2)} G_{(5)}$
10. Name the body part modified for food storage in the following
 - a. Carrot _____
 - b. Colocasia _____
 - c. Sweet potato _____
 - d. Asparagus _____
 - e. Radish _____
 - f. Potato _____
 - g. Dahlia _____
 - h. Turmeric _____
 - i. Gladiolus _____
 - j. Ginger _____
 - k. Portulaca _____

Short Answer Type Questions

1. Give two examples of roots that develop from different parts of the angiospermic plant other than the radicle.
2. The essential functions of roots are anchorage and absorption of water and minerals in the terrestrial plant. What functions are associated with the roots of aquatic plants. How are roots of aquatic plants and terrestrial plants different?
3. Draw diagrams of a typical monocot and dicot leaves to show their venation pattern.
4. A typical angiosperm flower consists of four floral parts. Give the names of the floral parts and their arrangements sequentially.
5. Given below are a few floral formulae of some well known plants. Draw floral diagrams from these formulae.
(i) $\oplus \overset{\curvearrowright}{K}_{(5)}, C_{(5)}, A_{(5)}, G_{(2)}$ (ii) $\Phi \overset{\curvearrowright}{K}_{(5)} C_{1+2+(2)} A_{(9)+1} G_{\underline{1}}$ (iii) $\oplus \overset{\curvearrowright}{K}_5 C_5 A_{5+5} G_{(5)}$
6. Reticulate venation is found in dicot leaves while in monocot leaves venation is of parallel type. Biology being a 'Science of exceptions', find out any exception to this generalization.
7. You have heard about several insectivorous plants that feed on insects. *Nepenthes* or the pitcher plant is one such example, which usually grows in shallow water or in marsh lands. What part of the plant is modified

into a 'pitcher'? How does this modification help the plant for food even though it can photosynthesize like any other green plant?

8. Mango and coconut are 'drupe' type of fruits. In mango fleshy mesocarp is edible. What is the edible part of coconut? What does milk of tender coconut represent?
9. How can you differentiate between free central and axile placentation?
10. Tendrils are found in the following plants. Identify whether they are stem tendrils or leaf tendrils.
 - a. Cucumber
 - b. Peas
 - c. Pumpkins
 - d. Grapevine
 - e. Watermelons
11. Why is maize grain usually called as a fruit and not a seed?
12. Tendrils of grapevines are homologous to the tendril of pumpkins but are analogous to that of pea. Justify the above statement.
13. Rhizome of ginger is like the roots of other plants that grows underground. Despite this fact ginger is a stem and not a root. Justify.
14. Differentiate between
 - a. Bract and Bracteole b. Pulvinus and petiole c. Pedicel and peduncle d. Spike and spadix
 - e. Stamen and staminoid f. Pollen and pollenium

Long Answer Type Questions

1. Distinguish between families Fabaceae, Solanaceae, Liliaceae on the basis of gynoecium characteristics (with figures), Also write economic importance of any one of the above family.
2. Describe various stem modifications associated with food storage, climbing and protection.
3. Stolon, offset and rhizome are different forms of stem modifications. How can these modified forms of stem be distinguished from each other?
4. The mode of arrangements of sepals or petals in a floral bud is known as aestivation. Draw the various types of aestivation possible for a typical pentamerous flower.
5. The arrangements of ovules within the ovary is known as placentation. What does the term placenta refer to? Name and draw various types of placentations in the flower as seen in T.S. or V.S..
6. Sunflower is not a flower. Explain.
7. How do you distinguish between hypogeal germination and epigeal germination? What is the role of cotyledon (s) and the endosperm in the germination of seeds?

Chapter-6- ANATOMY OF FLOWERING PLANTS

Multiple Choice Questions

1. A transverse section of stem is stained first with safranin and then with fast green following the usual schedule of double staining for the preparation of a permanent slide. What would be the colour of the stained xylem and phloem?
 - a. Red and green

- b. Green and red
- c. Orange and yellow
- d. Purple and orange

2. Match the followings and choose the correct option from below

A.	Meristem	i.	Photosynthesis, storage
B.	Parenchyma	ii.	mechanical support
C.	Collenchyma	iii.	Actively dividing cells
D.	Sclerenchyma	iv.	stomata
E.	Epidermal tissue	v.	sclereids

3. **Options:**

- a. A-i, B-iii, C-v, D-ii, E-iv
- b. A-iii, B-i, C-ii, D-v, E-iv
- c. A-ii, B-iv, C-v, D-i, E-iii
- d. A-v, B-iv, C-iii, D-ii, E-i

4. Match the following and choose the correct option from below

A.	Cuticle	i.	guard cells
B.	Bulliform cells	ii.	single layer
C.	Stomata	iii.	waxy layer
D.	Epidermis	iv.	empty colourless cell

5. Options:

- a. A-iii, B-iv, C-i, D-ii
- b. A-i, B-ii, C-iii, D-iv
- c. A-iii, B-ii, C-iv, D-i
- d. A-iii, B-ii, C-i, D-iv

6. Identify the tissue system from among the following

- a. Parenchyma
- b. Xylem
- c. Epidermis
- d. Phloem

7. Cells of this tissue are living and show angular wall thickening. They also provide mechanical support. The tissue is

- a. Xylem
- b. Sclerenchyma
- c. Collenchyma
- d. Epidermis

8. Epiblema of roots is equivalent to

- a. Pericycle

- b. Endodermis
 - c. Epidermis
 - d. Stele
9. A conjoint and open vascular bundle will be observed in the transverse section of
- a. Monocot root
 - b. Monocot stem
 - c. Dicot root
 - d. Dicot stem
10. Interfascicular cambium and cork cambium are formed due to
- a. Cell division
 - b. Cell differentiation
 - c. Cell dedifferentiation
 - d. Redifferentiation
11. Phellogen and Phellem respectively denote
- a. Cork and cork cambium
 - b. Cork cambium and cork
 - c. Secondary cortex and cork
 - d. Cork and secondary cortex
12. In which of the following pairs of parts of a flowering plant is epidermis absent?
- a. Root tip and shoot tip
 - b. Shoot bud and floral bud
 - c. Ovule and seed
 - d. Petiole and pedicel
13. How many shoot apical meristems are likely to be present in a twig of a plant possessing, 4 branches and 26 leaves
- a. 26
 - b. 1
 - c. 5
 - d. 30
 - e. 4
14. A piece of wood having no vessels (trachea) must belong to
- a. Teak
 - b. Mango
 - c. Pine
 - d. Palm
15. A plant tissue, when stained, showed the presence of hemicellulose and pectin in cell wall of its cells. The tissue represents
- a. Collenchyma
 - b. Sclerenchyma

- c. Xylem

- d. Meristem

16. Fibres are likely to be absent in

- a. Secondary phloem

- b. Secondary Xylem

- c. Primary phloem

- d. Leaves

17. When we peel the skin of a potato tuber, we remove

- a. Periderm

- b. Epidermis

- c. Cuticle

- d. Sapwood

18. A vesselless piece of stem possessing prominent sieve tubes would belong to

- a. Pinus

- b. Eucalyptus

- c. Grass

- d. Trochodendron

19. Which one of the following cell types always divides by anticlinal cell division?

- a. fusiform initial cells

- b, root cap

- c. protoderm

- d. phellogen

20. What is the fate of primary xylem in a dicot root showing extensive secondary growth?

- a. It is retained in the centre of the axis

- b. It gets crushed

- c. May or may not get crushed

- d. It gets surrounded by primary phloem

Very Short Answer Type Questions

1. Product of photosynthesis is transported from the leaves to various parts of the plants and stored in some cell before being utilised. What are the cells/ tissues that store them?

2. Protoxylem is the first formed xylem. If the protoxylem lies next to phloem what kind of arrangement of xylem would you call it?

3. What is the function of phloem parenchyma?

4. What is present on the surface of the leaves which helps the plant prevent loss of water but is absent in roots?

5. What is the epidermal cell modification in plants which prevents water loss?

6. What part of the plant would show the following:

- a. Radial vascular bundle

- b. Polyarch xylem

- c. Well developed pith
7. What are the cells that make the leaves curl in plants during water stress?
 8. What constitutes the cambial ring?
 9. Give one basic functional difference between phellogen and phelloderm.
 10. Arrange the following in the sequence you would find them in a plant starting from the periphery – phellem, phellogen, phelloderm.
 11. If one debarks a tree, what parts of the plant is being removed?
 12. The cross-section of a plant material showed the following features when viewed under the microscope.
 - a. The vascular bundles were radially arranged.
 - b. Four xylem strands with exarch condition of protoxylem. To which organ should it be assigned?
 13. What do hard wood and soft wood stand for?

Short Answer Type Questions

1. While eating peach or pear it is usually seen that some stone like structures get entangled in the teeth, what are these stone like structures called?
2. What is the commercial source of cork? How is it formed in the plant?
3. Below is a list of plant fibres. From which part of the plant these are obtained
 - a. Coir
 - b. Hemp
 - c. Cotton d. Jute
4. What are the characteristic differences found in the vascular tissue of gymnosperms and angiosperms?
5. Epidermal cells are often modified to perform specialized functions in plants. Name some of them and function they perform.
6. The lawn grass (*Cyandon dactylon*) needs to be mowed frequently to prevent its overgrowth. Which tissue is responsible for its rapid growth?
7. Plants require water for their survival. But when watered excessively, plants die. Discuss.
8. A transverse section of the trunk of a tree shows concentric rings which are known as growth rings. How are these rings formed? What is the significance of these rings?
9. Trunks of some of the aged tree species appear to be composed of several fused trunks. Is it a physiological or anatomical abnormality? Explain in detail.
10. What is the difference between lenticels and stomata?
11. Write the precise function of
 - a. Sieve tube
 - b. Interfascicular cambium
 - c. Collenchyma
 - d. Aerenchyma
12. The stomatal pore is guarded by two kidney shaped guard cells. Name the epidermal cells surrounding the guard cells. How does a guard cell differ from an epider mal cell? Use a diagram to illustrate your answer.
13. Point out the differences in the anatomy of, leaf of peepal (*Ficus religiosa*) and maize (*Zea mays*). Draw the diagrams and label the differences.
14. Palm is a monocotyledonous plant, yet it increases in girth. Why and how?

Long Answer Type Questions

1. The arrangement of ovules within the ovary is known as placentation. What does the term placenta refer to? Draw various types of placentations in the flower as seen in T.S. and V.S.
2. Deciduous plants shed their leaves during hot summer or in autumn. This process of shedding of leaves is called abscission. Apart from physiological changes what anatomical mechanism is involved in the abscission of leaves.
3. Is Pinus an evergreen tree? Comment.
4. Assume that a pencil box held in your hand, represents a plant cell. In how many possible planes can it be cut? Indicate these cuts with the help of line drawings.
5. Each of the following terms has some anatomical significance. What do these terms mean? Explain with the help of line diagrams.
 - a. Plasma Desmosomes/ Plasmodesmata
 - b. Middle lamella
 - c. Secondary wall
6. Distinguish between the following:
 - a. Exarch and endarch condition of protoxylem
 - b. Stele and vascular bundle
 - c. Protoxylem and metaxylem
 - d. Interfascicular cambium and interfascicular cambium
 - e. Open and closed vascular bundles
 - f. Stem hair and root hair

Give the reasons for seed dormancy and some methods to break it.

Chapter-7

STRUCTURAL ORGANISATION IN ANIMALS

Multiple Choice Questions

1. Which one of the following types of cell is involved in making of the inner walls of large blood vessels?
 - a. Cuboidal epithelium
 - b. Columnar epithelium
 - c. Squamous epithelium
 - d. stratified epithelium
2. To which one of the following categories does adipose tissue belong?
 - a. Epithelial
 - b. Connective
 - c. Muscular
 - d. Neural
3. Which one of the following is not a connective tissue?
 - a. Bone
 - b. Cartilage

- c. Blood
 - d. Muscles
4. The clitellum is a distinct part in the body of earthworm, it is found in?
- a. Segments 13 – 14 – 15
 - b. Segments 14 – 15 – 16
 - c. Segments 12 – 13 – 14
 - d. Segments 15 – 16 – 17
5. Setae help in locomotion in earthworm but not uniformly present in all the segments. Select among the following that represents setae.
- a. 1st segment
 - b. Last segment
 - c. Clitellar segment
 - d. 20th – 22nd segment
6. Which one of the following statements is true for cockroach?
- a. The number of ovarioles in each ovary are ten.
 - b. The larval stage is called caterpillar
 - c. Anal styles are absent in females
 - d. They are ureotelic

7. Match the followings and choose the correct option

- | | |
|-----------------------------------|------------------------|
| A. Adipose tissue | i. Nose |
| B. Stratified epithelium | ii. Blood |
| C. Hyaline cartilage | iii. skin |
| D. Fluid connective tissue | iv. Fat storage |

Options:

- a. A-i, B-ii, C-iii, D-iv
- b. A-iv, B-iii, C-i, D-ii
- c. A-iii, B-i, C-iv, D-ii
- d. A-ii, B-i, C-iv, D-iii

8. Match the followings and choose the correct answer

- | | |
|------------------------------------|--|
| A. Hermaphrodite | i. Produces blood cells and haemoglobin |
| B. Direct development | ii. Testis and ovary in the same animal |
| C. Chemoreceptor | iii. Larval form absent |
| D. Blood gland in earthworm | iv. Sense of chemical substances |

Options:

- a. A-ii, B-iii, C-iv, D-i
- b. A-iii, B-ii, C-iv, D-i
- c. A-i, B-iii, C-ii, D-i
- d. A-ii, B-iv, C-iii, D-i

9. Match the following with reference to Cockroach and choose the correct option
- | | |
|------------------|--------------------------------------|
| A. Phallomere | i. Chain of developing ova |
| B. Gonopore | ii. Bundles of sperm |
| C. Spermatophore | iii. Opening of the ejaculatory duct |
| D. Ovarioles | iv. The external genitalia |

Options:

- a. A-iii, B-iv, C-ii, D-i
- b. A-iv, B-iii, C-ii, D-i
- c. A-iv, B-ii, C-iii, D-i
- d. A-ii, B-iv, C-iii, D-i

10. Match the followings and choose the correct answer

- | | |
|----------------------|-------------------------------|
| A. Touch | i. Nasal epithelium |
| B. Smell | ii. Foramen magnum |
| C. Cranial nerves | iii. Sensory papillae |
| D. Medulla oblongata | iv. Peripheral nervous system |

Options:

- a. A-iii, B-i, C-ii, D-iv
- b. A-ii, B-i, C-iv, D-iii
- c. A-iii, B-iv, C-ii, D-i
- d. A-iii, B-i, C-iv, D-ii

Very Short Answer Type Questions

1. State the number of segments in earthworm which are covered by a prominent dark band or clitellum.
2. Where are sclerites present in Cockroach?
3. How many times do nymphs moult to reach the adult form of cockroach?
4. Identify the sex of a frog in which sound producing vocal sacs are present.
5. Name the process by which a tadpole develops into an adult frog.
6. What is the scientific term given to earthworm's body segments?
7. A muscle fibre tapers at both ends and does not show striations. Name the muscle fibre.
8. Name the different cell junctions found in tissues.
9. Give two identifying features of an adult male frog.
10. Which mouth part of cockroach is comparable to our tongue?
11. The digestive system of frog is made of the following parts. Arrange them in an order beginning from mouth.
Mouth, oesophagus, buccal cavity, stomach, intestine, cloaca, rectum, cloacal aperture
12. What is the difference between cutaneous and pulmonary respiration?
13. Special Venous connection between liver and intestine and between kidney and intestine is found in frog, what are they called?

Short Answer Type Questions

1. Give the location of hepatic caeca in a Cockroach. What is their function?
2. Frogs are beneficial for mankind, justify the statement.

3. The body of sponges does not possess tissue level of organisation though it is made of thousands of cells. Comment.
4. Structural organisation in animals attains different levels as cell – organ – organ system. What is missing in this chain? Mention the significance of such an organisation.
5. Stratified epithelial cells have limited role in secretion. Justify their role in our skin.
6. How does a gap junction facilitate intercellular communication?
7. Why are blood, bone and cartilage called connective tissue?
8. Why are neurons called excitable cells? Mention special features of the membrane of the neuron?
9. Why earthworm is called the friend of farmer?
10. How do you distinguish between dorsal and ventral surface of the body of earthworm.
11. Correct the wrong statements among the following:
 - a. In earthworm, a single male genital pore is present.
 - b. Setae help in locomotion of earthworm.
 - c. Muscular layer in the body wall of earthworm is made up of only circular muscles.
 - d. Typhlosole is the part of intestine of earthworm.
12. Why nephridia in earthworm that are basically similar in structure classified into three types? Mention the names of each.
13. Common name of some animals are given in Column A, write their scientific name in Column B.

Column A	Column B
a. Tiger	_____
b. Peacock	_____
c. Housefly	_____

14. Complete the following statement :
 - a. In Cockroach grinding of food particle is performed by _____ .
 - b. Malpighian tubules help in removal of _____ .
 - c. Hind gut of Cockroach is differentiated into _____ .
 - d. In Cockroach blood vessels open into spaces called _____ .
15. Mention special features of eye in Cockroach.
16. Frog is a poikilotherm, exhibits camouflage and undergoes aestivation and hibernation, how are all these beneficial to it?
17. Write the functions in brief in column B, appropriate to the structures given in column A.

Column A	Column B
a. Nictitating membrane	i. _____
b. Tympanum	ii. _____
c. Copulatory pad	iii. _____

18. Write the appropriate type of tissues in column B according to the functions mentioned in column A.

Column A	Column B
a. Secretion and absorption	i. _____
b. Protective covering	ii. _____
c. Linking and supporting framework	iii. _____

19. Using appropriate examples, differentiate between false and true body segmentation.

20. What is special about tissue present in the heart?

Long Answer Type Questions

1. Classify and describe epithelial tissue on the basis of structural modifications of cells.
2. Write down the common features of the connective tissue. On the basis of structure and function, differentiate between bones and cartilages.
3. Comment upon the gametic exchange in earthworm during mating.
4. Explain the digestive system of Cockroach with the help of a labelled sketch.

Chapter-8 CELL : THE UNIT OF LIFE

Multiple Choice Questions

1. A common characteristic feature of plant sieve tube cells and most of mammalian erythrocytes is
 - a. Absence of mitochondria
 - b. Presence of cell wall
 - c. Presence of haemoglobin
 - d. Absence of nucleus
2. Select one which is not true for ribosome
 - a. Made of two sub units
 - b. Form polysome
 - c. May attach to m RNA
 - d. Have no role in protein synthesis
3. Which one of these is not a eukaryote?
 - a. Euglena
 - b. Anabaena
 - c. Spirogyra
 - d. Agaricus
4. Which of the following dyes is best suited for staining chromosomes?
 - a. Basic Fuchsin
 - b. Safranin
 - c. Methylene blue
 - d. Carmine
5. Different cells have different sizes. Arrange the following cells in an ascending order of their size. Choose the correct option among the followings
 - i. Mycoplasma
 - ii. Ostrich eggs
 - iii. Human RBC
 - iv. Bacteria

Options:

 - a. i, iv, iii & ii
 - b. i, ii, iii & iv
 - c. ii, i, iii & iv

- d. iii, ii, i & iv
6. Which of the following features is common to prokaryotic and many eukaryotes?
- a. Chromosomes present
 - b. Cell wall present
 - c. Nuclear membrane present
 - d. Sub cellular organelles present
7. Who proposed the fluid mosaic model of plasma membrane?
- a. Camillo Golgi
 - b. Schleiden and Schwann
 - c. Singer and Nicolson
 - d. Robert Brown
8. Which of the following statements is true for a secretory cell?
- a. Golgi apparatus is absent
 - b. Rough Endoplasmic Reticulum (RER) is easily observed in the cell
 - c. Only Smooth Endoplasmic Reticulum (SER) is present
 - d. Secretory granules are formed in nucleus.
9. What is a tonoplast?
- a. Outer membrane of mitochondria
 - b. Inner membrane of chloroplast
 - c. Membrane boundry of the vacuole of plant cells
 - d. Cell membrane of a plant cell
10. Which of the following is not true of a eukaryotic cell?
- a. It has 80S type of ribosome present in the mitochondria
 - b. It has 80S type of ribosome present in the cytoplasm
 - c. Mitochondria contain circular DNA
 - d. Membrane bound organelles are present
11. Which of the following statements is not true for plasma membrane?
- a. It is present in both plant and animal cell
 - b. Lipid is present as a bilayer in it
 - c. Proteins are present integrated as well as loosely associated with the lipid bilayer
 - d. Carbohydrate is never found in it
12. Plastid differs from mitochondria on the basis of one of the following features. Mark the right answer.
- a. Presence of two layers of membrane
 - b. Presence of ribosome
 - c. Presence of chlorophyll
 - d. Presence of DNA
13. Which of the following is not a function of cytoskeleton in a cell?
- a. Intracellular transport
 - b. Maintenance of cell shape and structure

- c. Support of the organelle
 - d. Cell motility
14. The stain used to visualise mitochondria is
- a. Fast green
 - b. Safranin
 - c. Aceto carmine
 - d. Janus green

Very Short Answer Type Questions

1. What is the significance of vacuole in a plant cell?
2. What does 'S' refer in a 70S & an 80S ribosome?
3. Mention a single membrane bound organelle which is rich in hydrolytic enzymes.
4. What are gas vacuoles? State their functions?
5. What is the function of a polysome?
6. What is the feature of a metacentric chromosome?
7. What is referred to as satellite chromosome?

Short Answer Type Questions

1. Discuss briefly the role of nucleolus in the cells actively involved in protein synthesis.
2. Explain the association of carbohydrate to the plasma membrane and its significance.
3. Comment on the cartwheel structure of centriole.
4. Briefly describe the cell theory.
5. Differentiate between Rough Endoplasmic Reticulum (RER) and Smooth Endoplasmic Reticulum (SER).
6. Give the biochemical composition of plasma membrane. How are lipid molecules arranged in the membrane?
7. What are plasmids? Describe their role in bacteria?
8. What are histones? What are their functions?

Long Answer Type Questions

1. What structural and functional attributes must a cell have to be called a living cell?
2. Briefly give the contributions of the following scientists in formulating the cell theory
 - a. Robert Virchow
 - b. Schleiden and Schwann
3. Is extra genomic DNA present in prokaryotes and eukaryotes? If yes, indicate their location in both the types of organisms.
4. Structure and function are correlatable in living organisms. Can you justify this by taking plasma membrane as an example?
5. Eukaryotic cells have organelles which may
 - a. not be bound by a membrane
 - b. bound by a single membrane

- c. bound by a double membrane
Group the various sub-cellular organelles into these three categories.
6. The genomic content of the nucleus is constant for a given species where as the extra chromosomal DNA is found to be variable among the members of a population. Explain.
 7. Justify the statement, “Mitochondria are power houses of the cell”
 8. Is there a species specific or region specific type of plastids? How does one distinguish one from the other?
 9. Write the functions of the following
 - a. Centromere
 - b. Cell wall
 - c. Smooth ER
 - d. Golgi Apparatus e. Centrioles
 10. Are the different types of plastids interchangeable? If yes, give examples where they are getting converted from one type to another.

Chapter-9 BIOMOLECULES

Multiple Choice Questions

1. It is said that elemental composition of living organisms and that of inanimate objects (like earth’s crust) are similar in the sense that all the major elements are present in both. Then what would be the difference between these two groups? Choose a correct answer from among the following:
 - a. Living organisms have more gold in them than inanimate objects
 - b. Living organisms have more water in their body than inanimate objects
 - c. Living organisms have more carbon, oxygen and hydrogen per unit mass than inanimate objects.
 - d. Living organisms have more calcium in them than inanimate objects.
2. Many elements are found in living organisms either free or in the form of compounds. One of the following is not, found in living organisms.
 - a. Silicon
 - b. Magnesium
 - c. Iron
 - d. Sodium
3. Amino Acids, as the name suggests, have both an amino group and a carboxyl group in their structure. In addition, all naturally occurring amino acids (those which are found in proteins) are called L-amino acids. From this, can you guess from which compound can the simplest amino acid be made?
 - a. Formic acid
 - b. Methane
 - c. Phenol
 - d. Glycine
4. Many organic substances are negatively charged e.g., acetic acid, while others are positively charged e.g., ammonium ion. An aminoacid under certain conditions would have both positive and negative charges simultaneously in the same molecule. Such a form of aminoacid is called
 - a. Positively charged form

- b. Negatively charged form
 - c. Neutral form
 - d. Zwitterionic form
5. Sugars are technically called carbohydrates, referring to the fact that their formulae are only multiple of $C(H_2O)$. Hexoses therefore have six carbons, twelve hydrogens and six oxygen atoms. Glucose is a hexose. Choose from among the following another hexose.
- a. Fructose
 - b. Erythrose
 - c. Ribulose
 - d. Ribose
6. When you take cells or tissue pieces and grind them with an acid in a mortar and pestle, all the small biomolecules dissolve in the acid. Proteins, polysaccharides and nucleic acids are insoluble in mineral acid and get precipitated. The acid soluble compounds include aminoacids, nucleosides, small sugars etc. When one adds a phosphate group to a nucleoside one gets another acid soluble biomolecule called
- a. Nitrogen base
 - b. Adenine
 - c. Sugar phosphate
 - d. Nucleotide
7. When we homogenise any tissue in an acid the acid soluble pool represents
- a. Cytoplasm
 - b. Cell membrane
 - c. Nucleus
 - d. Mitochondria
8. The most abundant chemical in living organisms could be
- a. Protein
 - b. Water
 - c. Sugar
 - d. Nucleic acid
9. A homopolymer has only one type of building block called monomer repeated 'n' number of times. A heteropolymer has more than one type of monomer. Proteins are heteropolymers made of aminoacids. While a nucleic acid like DNA or RNA is made of only 4 types of nucleotide monomers, proteins are made of
- a. 20 types of monomers
 - b. 40 types of monomers
 - c. 3 types of monomers
 - d. only one type of monomer
10. Proteins perform many physiological functions. For example, some functions as enzymes. One of the following represents an additional function that some proteins discharge
- a. Antibiotics
 - b. Pigment conferring colour to skin
 - c. Pigments making colours of flowers
 - d. Hormones

11. Glycogen is a homopolymer made of

- a. Glucose units
- b. Galactose units
- c. Ribose units
- d. Aminoacids

12. The number of 'ends' in a glycogen molecule would be

- a. Equal to the number of branches plus one
- b. Equal to the number of branch points
- c. One
- d. Two, one on the left side and another on the right side

13. A pure protein should normally have

- a. Two ends
- b. One end
- c. Three ends
- d. No ends

14. Enzymes are bio catalysts. They catalyse biochemical reactions. In general they reduce activation energy of reactions. Many physico-chemical processes are enzyme mediated. Some examples of enzyme mediated reactions are given below. Tick the wrong entry

- a. Dissolving CO₂ in water
- b. Untwining the two strands of DNA
- c. Hydrolysis of sucrose
- d. Formation of peptide bond

Very Short Answer Type Questions

1. Medicines are either man made (i.e., synthetic) or obtained from living organisms like plants, bacteria, animals etc. and hence the latter are called natural products. Sometimes natural products are chemically altered by man to reduce toxicity or side effects. Write against each of the following whether they were initially obtained as a natural product or as a synthetic chemical.

- a. Penicillin _____
- b. Sulfonamide _____
- c. Vitamin C _____
- d. Growth Hormone _____

2. Select an appropriate chemical bond among ester bond, glycosidic bond, peptide bond and hydrogen bond and write against each of the following.

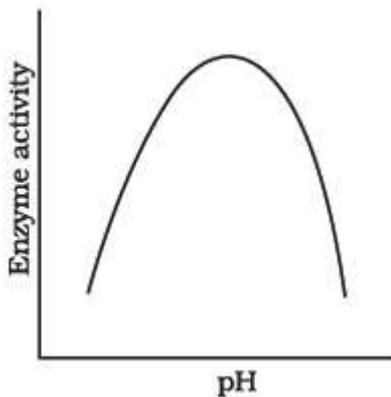
- a. Polysaccharide _____
- b. Protein _____
- c. Fat _____
- d. Water _____

3. Write the name of any one aminoacid, sugar, nucleotide and fatty acid.

4. Reaction given below is catalysed by oxidoreductase between two substrates A and A', complete the reaction.
A reduced + A' oxidised \rightarrow
5. How are prosthetic groups different from co-factors?
6. Glycine and Alanine are different with respect to one substituent on the α -carbon. What are the other common substituent groups?
7. Starch, Cellulose, Glycogen, Chitin are polysaccharides found among the following. Choose the one appropriate and write against each.
 - Cotton fibre _____
 - Exoskeleton of cockroach _____
 - Liver _____
 - Peeled potato _____

Short Answer Type Questions

1. Enzymes are proteins. Proteins are long chains of aminoacids linked to each other by peptide bonds. Aminoacids have many functional groups in their structure. These functional groups are, many of them at least, ionisable. As they are weak acids and bases in chemical nature, this ionization is influenced by pH of the solution. For many enzymes, activity is influenced by surrounding pH. This is depicted in the curve below, explain briefly.



2. Is rubber a primary metabolite or a secondary metabolite? Write four sentences about rubber.
3. Schematically represent primary, secondary and tertiary structures of a hypothetical polymer say for example a protein.
4. Nucleic acids exhibit secondary structure, justify with example.
5. Comment on the statement "living state is a non-equilibrium steady- state to be able to perform work".

Long Answer Type Questions

1. Formation of enzyme-substrate complex (ES) is the first step in catalysed reactions. Describe the other steps till the formation of product.
2. What are different classes of enzymes? Explain any two with the type of reaction they catalyse.
3. Nucleic acids exhibit secondary structure. Describe through Watson- Crick Model.
4. What is the difference between a nucleotide and nucleoside? Give two examples of each with their structure.
5. Describe various forms of lipid with a few examples.

Chapter-10 CELL CYCLE AND CELL DIVISION

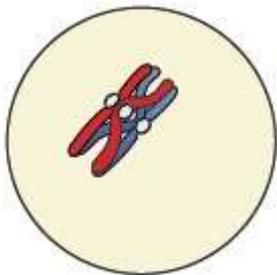
Multiple Choice Questions

1. Meiosis results in
 - a. Production of gametes
 - b. Reduction in the number of chromosomes
 - c. Introduction of variation
 - d. all of the above
2. At which stage of meiosis does the genetic constitution of gametes is finally decided
 - a. Metaphase I
 - b. Anaphase II
 - c. Metaphase II
 - d. Anaphase I
3. Meiosis occurs in organisms during
 - a. Sexual reproduction
 - b. Vegetative reproduction
 - c. Both sexual and vegetative reproduction
 - d. None of the above
4. During anaphase-I of meiosis
 - a. Homologous chromosomes separate
 - b. Non-homologous autosomes separate
 - c. Sister chromatids separate
 - d. Non-sister chromatids separate
5. Mitosis is characterised by
 - a. Reduction division
 - b. Equal division
 - c. Both reduction and equal division
 - d. None of the above
6. A bivalent of meiosis-I consists of
 - a. Two chromatids and one centromere
 - b. Two chromatids and two centromere
 - c. Four chromatids and two centromere
 - d. Four chromatids and four centromere
7. Cells which are not dividing are likely to be at
 - a. G1
 - b. G2
 - c. G₀
 - d. S phase

8. Which of the events listed below is not observed during mitosis?
 - a. Chromatin condensation
 - b. Movement of centrioles to opposite poles
 - c. Appearance of chromosomes with two chromatids joined together at the centromere.
 - d. Crossing over
9. Identify the wrong statement about meiosis
 - a. Pairing of homologous chromosomes
 - b. Four haploid cells are formed
 - c. At the end of meiosis the number of chromosomes are reduced to half
 - d. Two cycle of DNA replication occurs
10. Select the correct statement about G1 phase
 - a. Cell is metabolically inactive
 - b. DNA in the cell does not replicate
 - c. It is not a phase of synthesis of macromolecules
 - d. Cell stops growing

Very Short Answer Type Questions

1. Between a prokaryote and a eukaryote, which cell has a shorter cell division time?
2. Which of the phases of cell cycle is of longest duration?
3. Name a stain commonly used to colour chromosomes.
4. Which tissue of animals and plants exhibits meiosis?
5. Given that the average duplication time of E.coli is 20 minutes, how much time will two E.coli cells take to become 32 cells?
6. Which part of the human body should one use to demonstrate stages in mitosis?
7. What attributes does a chromatid require to be classified as a chromosome?
8. The diagram shows a bivalent at prophase-I of meiosis. Which of the four chromatids can cross over?



Prophase I

9. If a tissue has at a given time 1024 cells, how many cycles of mitosis had the original parental single cell undergone?
10. An anther has 1200 pollen grains. How many pollen mother cells must have been there to produce them?
11. At what stage of cell cycle does DNA synthesis take place?
12. It is said that the one cycle of cell division in human cells (eukaryotic cells) takes 24 hours. Which phase of the cycle, do you think occupies the maximum part of cell cycle?
13. It is observed that heart cells do not exhibit cell division. Such cells do not divide further and exit _____ phase to enter an inactive stage called _____ of cell cycle. Fill in the blanks.

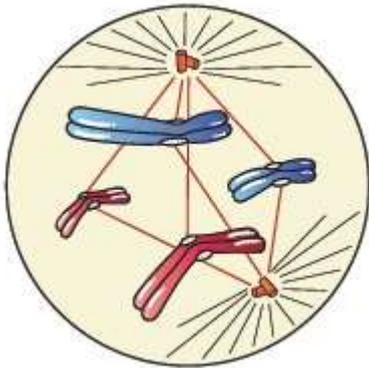
14. In which phase of meiosis are the following formed? Choose the answers from hint points given below.

- a. Synaptonemal complex _____
- b. Recombination nodules _____
- c. Appearance/activation of enzyme recombinase _____
- d. Termination of chiasmata _____
- e. Interkinesis _____
- f. Formation of dyad of cells _____

Hints : 1) Zygotene, 2) Pachytene, 3) Pachytene, 4) Diakinesis, 5) After Telophase-I /before Meiosis-II, 6) Telophase-I /After Meiosis-I.

Short Answer Type Questions

1. State the role of centrioles other than spindle formation.
2. Mitochondria and plastids have their own DNA (genetic material). What is known about their fate during nuclear division like mitosis?
3. Label the diagram and also determine the stage at which this structure is visible.



4. A cell has 32 chromosomes. It undergoes mitotic division. What will be the chromosome number (N) during metaphase? What would be the DNA content (C) during anaphase?
5. While examining the mitotic stage in a tissue, one finds some cells with 16 chromosomes and some with 32 chromosomes. What possible reasons could you assign to this difference in chromosome number. Do you think cells with 16 chromosomes could have arisen from cells with 32 chromosomes or vice versa?
6. The following events occur during the various phases of the cell cycle, Name the phase against each of the events.
 - a. Disintegration of nuclear membrane _____
 - b. Appearance of nucleolus _____
 - c. Division of centromere _____
 - d. Replication of DNA _____
7. Mitosis results in producing two cells which are similar to each other. What would be the consequence if each of the following irregularities occur during mitosis?
 - a. Nuclear membrane fails to disintegrate
 - b. Duplication of DNA does not occur
 - c. Centromeres do not divide
 - d. Cytokinesis does not occur.
8. Both unicellular and multicellular organisms undergo mitosis. What are the differences, if any, observed in the process between the two?

9. Name the pathological condition when uncontrolled cell division occurs.
10. Two key events take place, during S phase in animal cells, DNA replication and duplication of centriole. In which parts of the cell do events occur?
11. Comment on the statement – Meiosis enables the conservation of specific chromosome number of each species even though the process per se, results in reduction of chromosome number.
12. Name a cell that is found arrested in diplotene stage for months and years. Comment in 2-3 lines how it completes cell cycle?
13. How does cytokinesis in plant cells differ from that in animal cells?

Long Answer Type Questions

1. Comment on the statement – Telophase is reverse of prophase.
2. What are the various stages of meiotic prophase-I? Enumerate the chromosomal events during each stage?
3. Differentiate between the events of mitosis and meiosis
4. Write brief note on the following
 - a. Synaptonemal complex
 - b. Metaphase plate
5. Write briefly the significance of mitosis and meiosis in multicellular organism.
6. An organism has two pair of chromosomes (i.e., chromosome number = 4). Diagrammatically represent the chromosomal arrangement during different phases of meiosis-II.

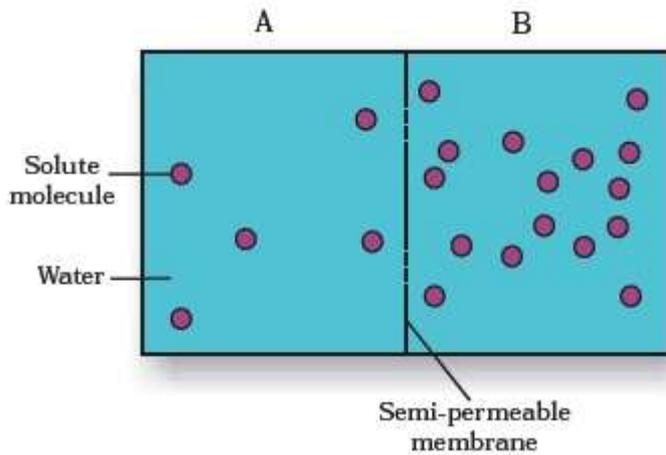
Chapter-11 **TRANSPORT IN PLANTS**

Multiple Choice Questions

1. Which of the following statements does not apply to reverse osmosis?
 - a. it is used for water purification.
 - b. In this technique, pressure greater than osmotic pressure is applied to the system
 - c. It is a passive process
 - d. It is an active process
2. Which one of the following will not directly affect transpiration?
 - a. temperature
 - b. light
 - c. wind speed
 - d. chlorophyll content of leaves
3. The lower surface of leaf will have more number of stomata in a
 - a. dorsiventral leaf
 - b. isobilateral leaf
 - c. both a and b
 - d. none of the above

4. The form of sugar transported through phloem is
- a. glucose
 - b. fructose
 - c. sucrose
 - d. ribose
5. The process of guttation takes place
- a. when the root pressure is high and the rate of transpiration is low.
 - b. when the root pressure is low and the rate of transpiration is high
 - c. when the root pressure equals the rate of transpiration
 - d. when the root pressure as well as rate of transpiration are high.
6. Which of the following is an example of imbibition
- a. uptake of water by root hair
 - b. exchange of gases in stomatal
 - c. swelling of seed when put in soil
 - d. opening of stomata
7. When a plant undergoes senescence, the nutrients may be
- a. exported
 - b. withdrawn
 - c. translocated
 - d. None of the above
8. Water potential of pure water at standard temperature is equal to
- a. 1 0
 - b. 2 0
 - c. Zero
 - d. None of the above
9. Choose the correct option mycorrhiza is a symbiotic association of fungus with root system which helps in
- A. Absorption of water
 - B. Mineral nutrition
 - C. Translocation
 - D. Gaseous exchange
- Options:**
- a. Only A
 - b. Only B
 - c. both A and B
 - d. both B and C

10. Based on the figure given below which of the following statements is not correct?



- a. Movement of solvent molecules will take place from chamber A to B.
- b. Movement of solute will take place from A to B.
- c. Presence of a semipermeable is a pre-requisite for this process to occur.
- d. The direction and rate of osmosis depends on both the pressure gradient and concentration gradient.

11. Match the followings and choose the correct option

- | | |
|---------------------|---------------------------------|
| A. leaves | i. Anti-transpirant |
| B. seed | ii. Transpiration |
| C. Roots | iii. negative osmotic potential |
| D. Aspirin | iv. Imbibition |
| E. Plasmolyzed cell | v. Absorbtion |

Options:

- a. A-iii, B-iv, C-i, D-ii
- b. A-i, B-ii, C-iii, D-iv
- c. A-iii, B-ii, C-iv, D-i
- d. A-iii, B-ii, C-i, D-iv

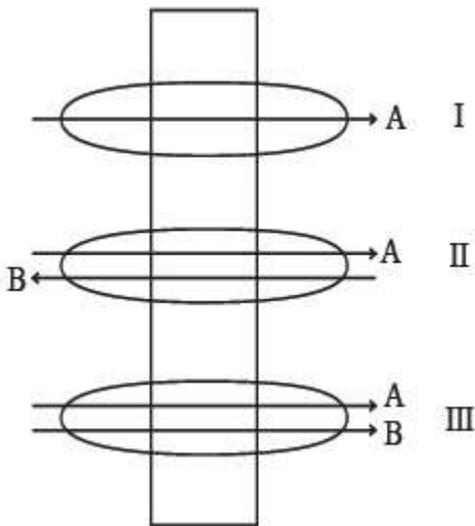
12. Mark the mismatched pair.

- | | |
|-----------------|--|
| a. Amyloplast | i. store protein granule |
| b. Elaioplast | ii. store oils or fats |
| c. Chloroplasts | iii. contain chlorophyll pigments |
| d. Chromoplasts | iv. contain coloured pigments other than chlorophyll |
| e. Leucoplast | v. contains colourless pigments |

Very Short Answer Type Questions

1. Smaller, lipid soluble molecules diffuse faster through cell membrane, but the movement of hydrophilic substances are facilitated by certain transporters which are chemically _____.
2. In a passive transport across a membrane, when two protein molecules move in opposite direction and independent of each other, it is called as _____.
3. Osmosis is a special kind of diffusion, in which water diffuses across the cell membrane. The rate and direction of osmosis depends upon both _____.

4. A flowering plant is planted in an earthen pot and irrigated. Urea is added to make the plant grow faster, but after some time the plant dies. This may be due to _____.
5. Absorption of water from soil by dry seeds increases the _____, thus helping seedlings to come out of soil
6. Water moves up against gravity and even for a tree of 20m height, the tip receives water within two hours. The most important physiological phenomenon which is responsible for the upward movement of water is _____
7. The plant cell cytoplasm is surrounded by both cell wall and cell membrane. The specificity of transport of substances are mostly across the cell membrane, because _____.
8. The C_4 plants are twice as efficient as C_3 plants in terms of fixing CO_2 but lose only _____ as much water as C_3 plants for the same amount of CO_2 fixed.
9. Movement of substances in xylem is unidirectional while in phloem it is bidirectional. Explain.
10. Identify the process occurring in I, II and III



11. Given below is a table. Fill in the gaps

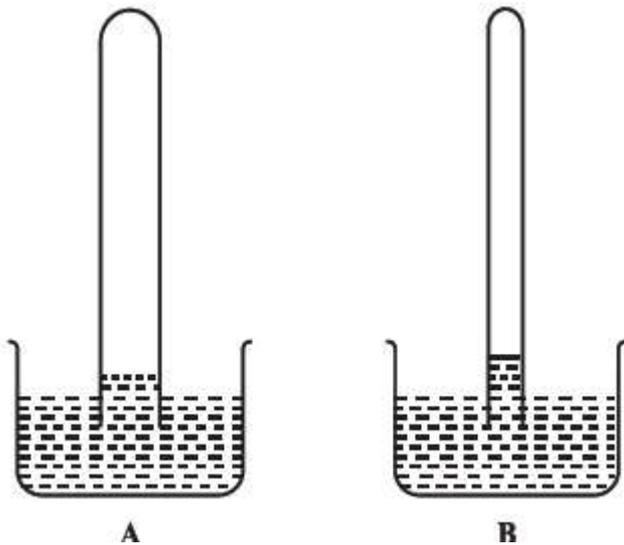
Property	Simple diffusion	facilitated transport	Active Transport
i Highly selective	_____	Yes	_____
ii Uphill transport	_____	_____	Yes
iii Requires ATP	_____	_____	_____

12. Define water potential and solute potential.
13. Why is solute potential always negative? Explain $y_w = y_s + y_p$
14. An onion peel was taken and
 - a. Placed in salt solution for five minutes.
 - b. After that it was placed in distilled water.
 When seen under the microscope what would be observed in a and b?
15. Differentiate between Apoplast and Symplast pathways of water movement. Which of these would need active transport?
16. How does most of the water moves within the root?
17. Give the location of casparian strip and explain its role in the water movement.
18. Differentiate between guttation and transpiration.
19. Transpiration is a necessary evil in plants. Explain.

20. Describe briefly the three physical properties of water which helps in ascent of water in xylem.
21. A gardener forgot to water a potted plant for a day during summer, what will happen to the plant? Do you think it is reversible? If yes, how?
22. Identify a type of molecular movement which is highly selective and requires special membrane proteins, but does not require energy.
23. Correct the statements
 - a. Cells shrink in hypotonic solutions and swell in hypertonic solutions.
 - b. Imbibition is a special type of diffusion when water is absorbed by living cells.
 - c. Most of the water flow in the roots occurs via the symplast

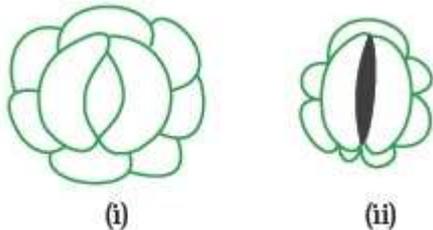
Short Answer Type Questions

1. Minerals absorbed by the roots travel up the xylem. How do they reach the parts where they are needed most? Do all the parts of the plant get the same amount of the minerals?
2. If one wants to find minerals and in the form they are mobilised in the plant, how will an analysis of the exudate help?
3. From your knowledge of physiology can you think of some method of increasing the life of cut plants in a vase?
4. Do different species of plants growing in the same area show the same rate of transpiration at a particular time? Justify your answer.
5. Water is indispensable for life. What properties of water make it useful for all biological processes on the earth?
6. How is it that the intracellular levels of K^+ are higher than extracellular levels in animal cells?
7. Cut pieces of beetroot do not leave colour in cold water but do so in hot water. Explain.
8. In a girdled plant, when water is supplied to the leaves above the girdle, leaves may remain green for sometime then wilt and ultimately die. What does it indicate?
9. Various types of transport mechanisms are needed to fulfil the mineral requirements of a plant. Why are they not fulfilled by diffusion alone?
10. How can plants be grown under limited water supply without compromising on metabolic activities?
11. Will the ascent of sap be possible without the cohesion and adhesion of the water molecules? Explain.
12. Keep some freshly cut flowers in a solution of food colour. Wait for sometime for the dye to rise in the flower, when the stem of the flower is held up in light, coloured strands can be seen inside. Can this experiment demonstrate which tissue is conducting water up the stem?
13. When a freshly collected *Spirogyra* filament is kept in a 10% potassium nitrate solution, it is observed that the protoplasm shrinks in size:
 - a. What is this phenomenon called?
 - b. What will happen if the filament is replaced in distilled water?
14. Sugar crystals do not dissolve easily in ice cold water. Explain.
15. Salt is applied to tennis lawns to kill weeds. How does salting tennis lawns help in killing of weeds without affecting the grass?
16. What is the chemical composition of xylem and phloem sap?
17. If you are provided with two tubes (A and B), where one is narrow and the other is relatively wider and if both are immersed in a beaker containing water as shown in the figure given on next page.



Why does B show higher water rise than A?

18. What are 'aquaporins'? How does presence of aquaporins affect osmosis?
19. ABA (Abscisic acid) is called a stress hormone.
 - a. How does this hormone overcome stress conditions?
 - b. From where does this hormone get released in leaves?
20. We know that plants are harmed by excess water. But plants survive under flooded condition. How are they able to manage excess water?
21. Differentiate between diffusion and translocation in plants.
22. How is facilitated diffusion different from diffusion?
23. Explain the mass flow hypothesis of transport in phloem.
24. Observe the diagram and answer the following;

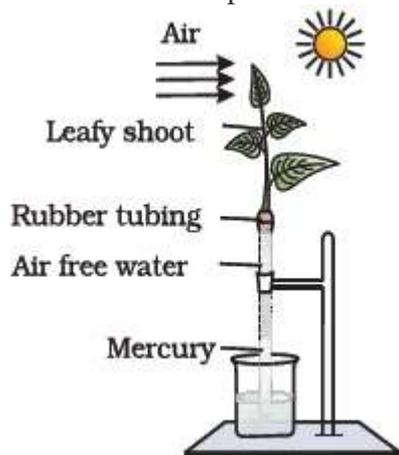


- a. Are these types of guard cells found in monocots or dicots?
 - b. Which of these shows a higher water content (i) or (ii)?
 - c. Which element plays an important role in the opening and closing of stomata?
25. Define Uniport, Symport and Antiport. Do they require energy?

Long Answer Type Questions

1. Minerals are present in the soil in sufficient amounts. Do plants need to adjust the types of solutes that reach the xylem? Which molecules help to adjust this? How do plants regulate the type and quantity of solutes that reach xylem?
2. Plants show temporary and permanent wilting. Differentiate between the two. Do any of them indicate the water status of the soil?
3. Which of these is a semipermeable membrane (S.P) and which is selectively permeable (S.L)
 - a. Animal Bladder
 - b. Plasmalemma

- c. Tonoplast
 - d. Parchment membrane e. Egg membrane
4. Halophytes may show precell pressure very much higher than atmospheric pressure. Explain how this can happen?
 5. The radio labelled carbon in carbon dioxide supplied to potato plants in an experiment was seen in the tuber eventually. Trace the movement of the labelled carbon dioxide.
 6. Water molecule is very polar. Polar end of molecule attracts opposite charges on another water molecule (acts like magnet). How will you explain this property of water with reference to upward movement of water? Comment on the upward movement of water given the intermolecular hydrogen bonding in water.
 7. Comment on the experimental setup



- a. What does the setup demonstrate?
- b. What will happen to the level of water if a blower is placed close to setup.
- c. Will the mercury level fluctuate (go up/down) if phenyl mercuric acetate is sprayed on leaves?

Chapter-12 MINERAL NUTRITION

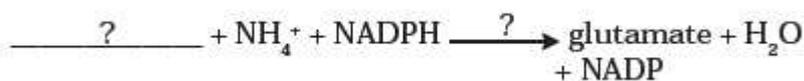
Multiple Choice Questions

1. Which one of the following roles is not characteristic of an essential element?
 - a. being a component of biomolecules
 - b. changing the chemistry of soil
 - c. being a structural component of energy related chemical compounds
 - d. activation or inhibition of enzymes
2. Which one of the following statements can best explain the term critical concentration of an essential element?
 - a. essential element concentration below which plant growth is retarded.
 - b. essential element concentration below which plant growth becomes stunted.
 - c. essential element concentration below which plant remains in the vegetative phase.
 - d. none of the above
3. Deficiency symptoms of an element tend to appear first in young leaves. It indicates that the element is relatively immobile. Which one of the following elemental deficiency would show such symptoms?

- a. sulphur
 - b. magnesium
 - c. nitrogen
 - d. potassium
4. Which one of the following symptoms is not due to manganese toxicity in plants?
- a. Calcium translocation in shoot apex is inhibited
 - b. Deficiency in both Iron and Nitrogen is induced
 - c. Appearance of brown spot surrounded by chlorotic veins
 - d. None of the above
5. Reaction carried out by N₂ fixing microbes include
- a. $2\text{NH}_3 + 3\text{O}_2 \rightarrow 2\text{NO}_3^- + 2\text{H}^+ + 2\text{H}_2\text{O}$ (i)
 - b. $2\text{NO}_2^- + \text{O}_2 \rightarrow 2\text{NO}_3^-$ (ii)
- Which of the following statements about these equations is not true
- a. step (i) is carried out by Nitrosomonas or Nitrococcus
 - b. step (ii) is carried out by Nitrobacter
 - c. both steps (i) and (ii) can be called nitrification
 - d. bacteria carrying out these steps are usually photoautotrophs
6. With regard to the Biological Nitrogen Fixation by Rhizobium in association with soybean, which one of the following statement/ statements does not hold true.
- a. Nitrogenase may require oxygen for its functioning.
 - b. Nitrogenase is MO- Fe protein
 - c. Leg-hemoglobin is a pink coloured pigment.
 - d. Nitrogenase helps to convert N₂ gas into two molecules of ammonia.
7. Match the element with its associated functions/roles and choose the correct option among given below
- | | |
|----------------------|---|
| A. Boron | i. splitting of H₂O to liberate O₂ during photosynthesis |
| B. Manganese | ii. needed for synthesis of auxins |
| C. Molybdenum | iii. component of nitrogenase |
| D. Zinc | iv. Pollen germination |
| E. Iron | v. component of ferredoxin |
- Options
- a. A-i, B-ii, C-iii, D-iv, E-v
 - b. A-iv, B-i, C-iii, D-ii, E-v
 - c. A-iii, B-ii, C-iv, D-v, E-i
 - d. A-ii, B-iii, C-v, D-i, E-iv
8. Plants can be grown in (Tick the incorrect option)
- a. soil with essential nutrients.
 - b. water with essential nutrients.
 - c. either water or soil with essential nutrients.
 - d. water or soil without essential nutrients.

Very Short Answer Type Questions

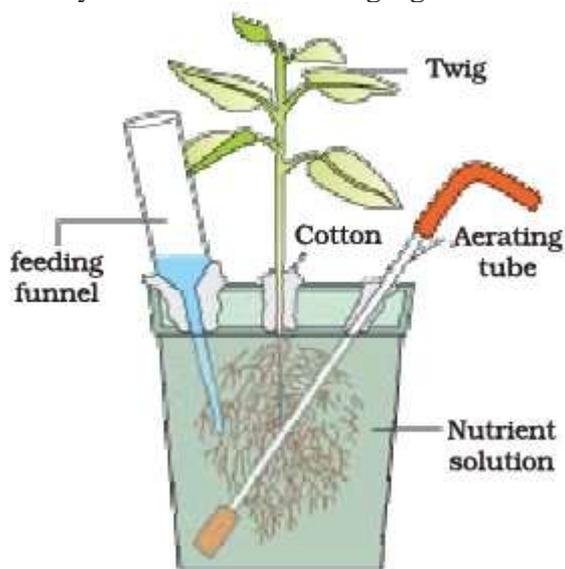
1. Name a plant, which accumulate silicon.
2. Mycorrhiza is a mutualistic association. How do the organisms involved in this association gain from each other?
3. Nitrogen fixation is shown by prokaryotes and not eukaryotes. Comment?
4. Carnivorous plants like Nepenthes and Venus fly trap have nutritional adaptations. Which nutrient do they especially obtain and from where?
5. Think of a plant which lacks chlorophyll. From where will it obtain nutrition? Give an example of such a type of plant.
6. Name an insectivorous angiosperm.
7. A farmer adds Azotobacter culture to soil before sowing maize. Which mineral element is being replenished?
8. What type of conditions are created by leghaemoglobin in the root nodule of a legume?
9. What is common to Nepenthes, utricularia and Drosera with regard to mode of nutrition?
10. Plants with zinc deficiency show reduced biosynthesis of .
11. Yellowish edges appear in leaves deficient in .
12. Name the macronutrient which is a component of all organic compounds but is not obtained from soil.
13. Name one non-symbiotic nitrogen fixing prokaryote.
14. Rice fields produce an important green house gas. Name it.
15. Complete the equation for reductive amination



16. Excess of Mn in soil leads to deficiency of Ca, Mg and Fe. Justify.

Short Answer Type Questions

1. How is sulphur important for plants? Name the aminoacids in which it is present.
2. How are organisms like Pseudomonas and Thiobacillus of great significance in nitrogen cycle?
3. Carefully observe the following figure



- a. Name the technique shown in the figure and the scientist who demonstrated this technique for the first time.
- b. Name atleast three plants for which this technique can be employed for their commercial production.

- c. What is the significance of aerating tube and feeding funnel in this setup?
4. Name the most crucial enzyme found in root nodules for N_2 fixation? Does it require a special pink coloured pigment for its functioning? Elaborate.
 5. How are the terms 'critical concentration' and 'deficient' different from each other in terms of concentration of an essential element in plants? Can you find the values of 'critical concentration' and 'deficient' for minerals – Fe & Zn.
 6. Carnivorous plants exhibit nutritional adaptation. Citing an example explain this fact.
 7. A farmer adds/ supplies Na, Ca, Mg and Fe regularly to his field and yet he observes that the plants show deficiency of Ca, Mg and Fe. Give a valid reason and suggest a way to help the farmer improve the growth of plants.

Long Answer Type Questions

1. It is observed that deficiency of a particular element showed its symptoms initially in older leaves and then in younger leaves.
 - a. Does it indicate that the element is actively mobilized or relatively immobile?
 - b. Name two elements which are highly mobile and two which are relatively immobile.
 - c. How is the aspect of mobility of elements important to horticulture and agriculture?
2. We find that *Rhizobium* forms nodules on the roots of leguminous plants. Also *Frankia* another microbe forms nitrogen fixing nodules on the roots of non-leguminous plant *Alnus*.
 - a. Can we artificially induce the property of nitrogen fixation in a plant – leguminous or non-leguminous?
 - b. What kind of relationship is observed between mycorrhiza and pine trees?
 - c. Is it necessary for a microbe to be in close association with a plant to provide mineral nutrition? Explain with the help of one example.
3. What are essential elements for plants? Give the criteria of essentiality?
How are minerals classified depending upon the amount in which they are needed by the plants?
4. With the help of examples describe the classification of essential elements based on the function they perform.
5. We know that plants require nutrients. If we supply these in excess, will it be beneficial to the plants? If yes, how/ If no, why?
6. Trace the events starting from the coming in contact of *Rhizobium* to a leguminous root till nodule formation. Add a note on importance of leg hemoglobin
7. Give the biochemical events occurring in the root nodule of a pulse plant. What is the end product? What is its fate?
8. Hydroponics have been shown to be a successful technique for growing of plants. Yet most of the crops are still grown on land. Why?

Chapter-13

PHOTOSYNTHESIS IN HIGHER PLANTS

Multiple Choice Questions

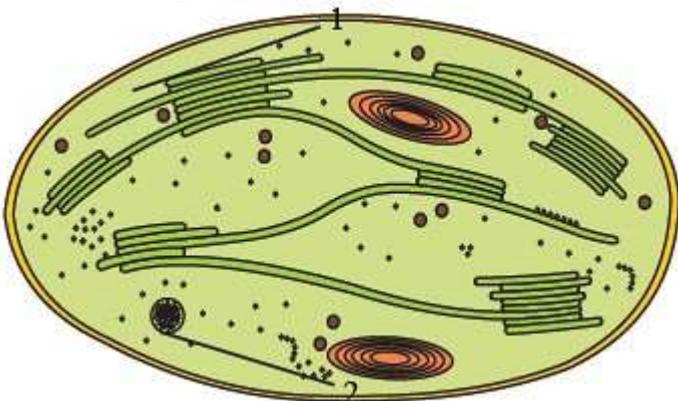
1. Which metal ion is a constituent of chlorophyll?
 - a. Iron

- b. Copper
 - c. Magnesium
 - d. Zinc
2. Which pigment acts directly to convert light energy to chemical energy?
- a. Chlorophyll a
 - b. Chlorophyll b
 - c. Xanthophyll
 - d. Carotenoid
3. Which range of wavelength (in nm) is called photosynthetically active radiation (PAR)?
- a. 100 – 390
 - b. 390 – 430
 - c. 400 – 700
 - d. 760 – 100,00
4. Which light range is most effective in photosynthesis?
- a. Blue
 - b. Green
 - c. Red
 - d. Violet
5. Chemosynthetic bacteria obtain energy from
- a. Sun
 - b. Infra red rays
 - c. Organic substances
 - d. Inorganic chemicals
6. Energy required for ATP synthesis in PSII comes from
- a. Proton gradient
 - b. Electron gradient
 - c. Reduction of glucose
 - d. Oxidation of glucose
7. During light reaction in photosynthesis the following are formed:
- a. ATP and sugar
 - b. Hydrogen, O₂ and sugar
 - c. ATP, hydrogen donor and O₂
 - d. ATP, hydrogen and O₂ donor
8. Dark reaction in photosynthesis is called so because
- a. It can occur in dark also
 - b. It does not depend on light energy
 - c. It cannot occur during day light
 - d. It occurs more rapidly at night
9. PEP is primary CO₂ acceptor in
- a. C₄ plants

- b. C₃ plants
 - c. C₂ plants
 - d. Both C₃ and C₄ plants
10. Splitting of water is associated with
- a. Photosystem I
 - b. Lumen of thylakoid
 - c. Both Photosystem I and II
 - d. Inner surface of thylakoid membrane
11. The correct sequence of flow of electrons in the light reaction is
- a. PSII, plastoquinone, cytochromes, PSI, ferredoxin
 - b. PSI, plastoquinone, cytochromes, PSII, ferredoxin
 - c. PSI, ferredoxin, PSII,
 - d. PSI, plastoquinone, cytochromes, PSII, ferredoxin
12. The enzyme that is not found in a C₃ plant is
- a. RuBP Carboxylase
 - b. PEP Carboxylase
 - c. NADP reductase
 - d. ATP synthase
13. The reaction that is responsible for the primary fixation of CO₂ is catalysed by
- a. RuBP carboxylase
 - b. PEP carboxylase
 - c. RuBP carboxylase and PEP carboxylase
 - d. PGA synthase
14. When CO₂ is added to PEP, the first stable product synthesised is:
- a. Pyruvate
 - b. Glyceraldehyde-3-phosphate
 - c. Phosphoglycerate
 - d. Oxaloacetate

Very Short Answer Type Questions

1. Examine the figure



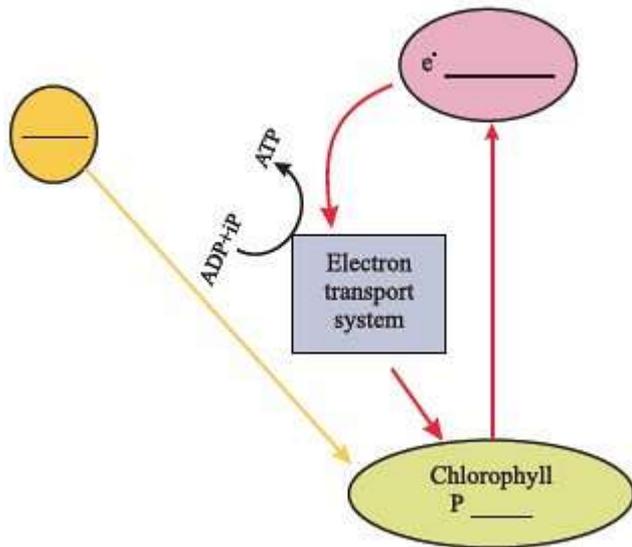
- a. Is this structure present in animal cell or plant cell?

- b. Can these be passed on to the progeny? How?
 - c. Name the metabolic processes taking place in the places marked (1) and (2).
2. $2\text{H}_2\text{O} \rightarrow 2\text{H}^+ + \text{O}_2 + 4\text{e}^-$
Based on the above equation, answer the following questions:
 - a. Where does this reaction take place in plants?
 - b. What is the significance of this reaction?
 3. Cyanobacteria and some other photosynthetic bacteria don't have chloroplasts. How do they conduct photosynthesis?
 4. a. NADP reductase enzyme is located on .
b. Breakdown of proton gradient leads to release of .
 5. Can girdling experiments be done in monocots? If yes, How? If no, why not?
 6. $3\text{CO}_2 + 9\text{ATP} + 6\text{NADPH} + \text{Water} \rightarrow \text{glyceraldehyde 3-phosphate} + 9\text{ADP} + 6\text{NADP}^+ + 8\text{Pi}$
Analyze the above reaction and answer the following questions:
 - a. How many molecules of ATP & NADPH are required to fix one molecule of CO_2 ?
 - b. Where in the chloroplast does this process occur?
 7. Does moonlight support photosynthesis? Find out.
 8. Some of these terms/chemicals are associated with the C_4 cycle. Explain.
 - a. Hatch slack pathway
 - b. Calvin cycle
 - c. PEP carboxylase
 - d. Bundle sheath cells
 9. Where is NADP reductase enzyme located in the chloroplast? What is the role of this enzyme in proton gradient development?
 10. ATPase enzyme consists of two parts. What are those parts? How are they arranged in the thylakoid membrane? Conformational change occur in which part of the enzyme?
 11. Which products formed during the light reaction of photosynthesis are used to drive the dark reaction?
 12. What is the basis for designating C_3 and C_4 pathways of photosynthesis?

Short Answer Type Questions

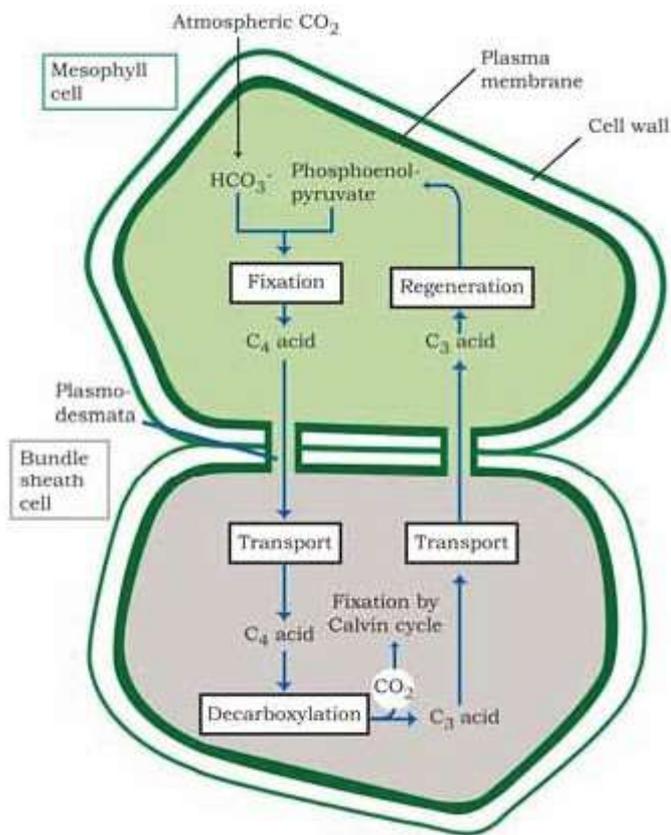
1. Succulents are known to keep their stomata closed during the day to check transpiration. How do they meet their photosynthetic CO_2 requirements?
2. Chlorophyll 'a' is the primary pigment for light reaction. What are accessory pigments? What is their role in photosynthesis?
3. Do reactions of photosynthesis called, as 'Dark Reaction' need light? Explain.
4. How are photosynthesis and respiration related to each other?
5. If a green plant is kept in dark with proper ventilation, can this plant carry out photosynthesis? Can anything be given as supplement to maintain its growth or survival?
6. Photosynthetic organisms occur at different depths in the ocean. Do they receive qualitatively and quantitatively the same light? How do they adapt to carry out photosynthesis under these conditions?
7. In tropical rain forests, the canopy is thick and shorter plants growing below it, receive filtered light. How are they able to carry out photosynthesis ?
8. What conditions enable Rubis CO to function as an oxygenase? Explain the ensuing process.
9. Why does the rate of photosynthesis decrease at higher temperatures?
10. Explain how during light reaction of photosynthesis, ATP synthesis is a chemiosmotic phenomenon.

11. Find out how Melvin Calvin worked out the complete biosynthetic pathway for synthesis of sugar.
12. Six turns of Calvin cycle are required to generate one mole of glucose. Explain.
13. Complete the flow chart for cyclic photophosphorylation of the photosystem-I



14. In what kind of plants do you come across 'Kranz' anatomy? To which conditions are those plants better adapted? How are these plants better adapted than the plants, which lack this anatomy?
15. A process is occurring throughout the day, in 'X' organism. Cells are participating in this process. During this process ATP, CO₂ and water are evolved. It is not a light dependent process.
 - a. Name the process.
 - b. Is it a catabolic or an anabolic process?
 - c. What could be the raw material of this process?
16. Tomatoes, carrots and chillies are red in colour due to the presence of one pigment. Name the pigment. Is it a photosynthetic pigment?
17. Why do we believe chloroplast and mitochondria to be semi-autonomous organelle?

18. Observe the diagram and answer the following.

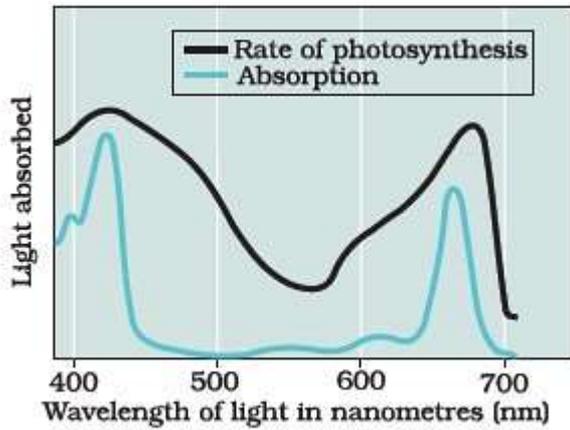


- a. Which group of plants exhibits these two types of cells?
 - b. What is the first product of C_4 cycle?
 - c. Which enzyme is there in bundle sheath cells and mesophyll cells?
19. A cyclic process is occurring in C_3 plant, which is light dependent, and needs O_2 . This process doesn't produce energy rather it consumes energy.
- a. Can you name the given process?
 - b. Is it essential for survival?
 - c. What are the end products of this process?
 - d. Where does it occur?
20. Suppose Euphorbia and Maize are grown in the tropical area.
- a. Which one of them do you think will be able to survive under such conditions?
 - b. Which one of them is more efficient in terms of photosynthetic activity?
 - c. What difference do you think are there in their leaf anatomy?

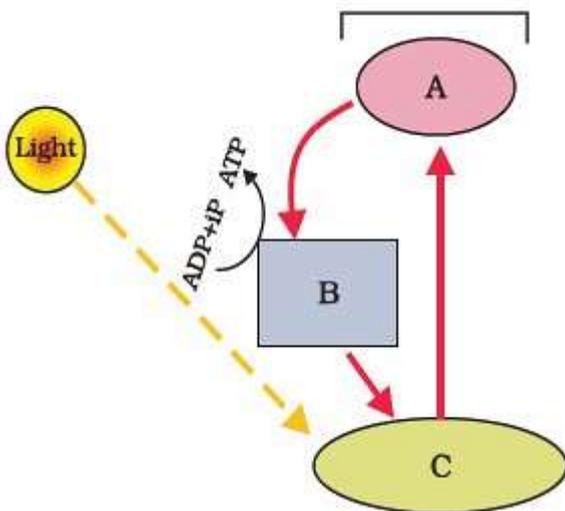
Long Answer Type Questions

1. Is it correct to say that photosynthesis occurs only in leaves of a plant? Besides leaves, what are the other parts that may be capable of carrying out photosynthesis? Justify.
2. The entire process of photosynthesis consists of a number of reactions. Where in the cell do each of these take place?
 - a. Synthesis of ATP & NADPH _____
 - b. Photolysis of water _____
 - c. Fixation of CO_2 _____
 - d. Synthesis of sugar molecule _____
 - e. Synthesis of starch _____

- Which property of the pigment is responsible for its ability to initiate the process of photosynthesis? Why is the rate of photosynthesis higher in the red and blue regions of the spectrum of light?
- What can we conclude from the statement that the action and absorption spectrum of photosynthesis overlap? At which wavelength do they show peaks?
- Under what conditions are C₄ plants superior to C₃?
- In the figure given below, the black line (upper) indicates action spectrum for photosynthesis and the lighter line (lower) indicates the absorption spectrum of chlorophyll a, answer the followings:



- What does the action spectrum indicate? How can we plot an action spectrum? Explain with an example.
 - How can we derive an absorption spectrum for any substance?
 - If chlorophyll a is responsible for light reaction of photosynthesis, why do the action spectrum and absorption spectrum not overlap?
- What are the important events and end products of the light reaction?
 - In the diagram shown below label A, B, C. What type of phosphorylation is possible in this?



- Why is the RuBisCo enzyme more appropriately called RUBP Carboxylase-Oxygenase and what important role does it play in photosynthesis?
- What special anatomical features are displayed by leaves of C₄ plants? How do they provide advantage over the structure of C₃ plants?
- Name the two important enzymes of C₃ and C₄ pathway, respectively? What important role do they play in fixing CO₂?
- Why is RuBisCo enzyme the most abundant enzyme in the world?
- Why does not photorespiration take place in C₄ plants?

Chapter-14 Respiration in Plants

Multiple Choice Questions

- The ultimate electron acceptor of respiration in an aerobic organisms is:
 - a. Cytochrome
 - b. Oxygen
 - c. Hydrogen
 - d. Glucose
- Phosphorylation of glucose during glycolysis is catalysed by
 - a. Phosphoglucomutase
 - b. Phosphoglucoisomerase
 - c. Hexokinase
 - d. Phosphorylase
- Pyruvic acid, the key product of glycolysis can have many metabolic fates. Under aerobic condition it forms
 - a. Lactic acid
 - b. $\text{CO}_2 + \text{H}_2\text{O}$
 - c. Acetyl CoA + CO_2
 - d. Ethanol + CO_2
- Electron Transport System (ETS) is located in mitochondrial
 - a. Outer membrane
 - b. Inter membrane space
 - c. Inner membrane
 - d. Matrix
- Which of the following exhibits the highest rate of respiration?
 - a. Growing shoot apex
 - b. Germinating seed
 - c. Root tip
 - d. Leaf bud
- Choose the correct statement:
 - a. Pyruvate is formed in the mitochondrial matrix.
 - b. During the conversion of succinyl Co-A to succinic acid a molecule of ATP is synthesized.
 - c. Oxygen is vital in respiration for removal of hydrogen.
 - d. There is complete breakdown of glucose in fermentation.
- Mitochondria are called powerhouses of the cell. Which of the following observations support this statement?
 - a. Mitochondria synthesise ATP
 - b. Mitochondria have a double membrane
 - c. The enzymes of the Krebs cycle and the cytochromes are found in mitochondria.

- d. Mitochondria are found in almost all plants and animal cells.
8. The end product of oxidative phosphorylation is
- a. NADH
 - b. Oxygen
 - c. ADP
 - d. ATP+H₂O
9. Match the following and choose the correct option from those given below.

Column A

- A. Molecular oxygen
- B. Electron acceptor
- C. Pyruvate dehydrogenase
- D. Decarboxylation

Column B

- i. α - Ketoglutaric acid
- ii. hydrogen acceptor
- iii. cytochrome C
- iv. acetyl Co A

Options

- a. A-ii, B-iii, C-iv, D-i
- b. A-iii, B-iv, C-ii, D-i
- c. A-ii, B-i, C-iii, D-iv
- d. A-iv, B-iii, C-i, D-ii

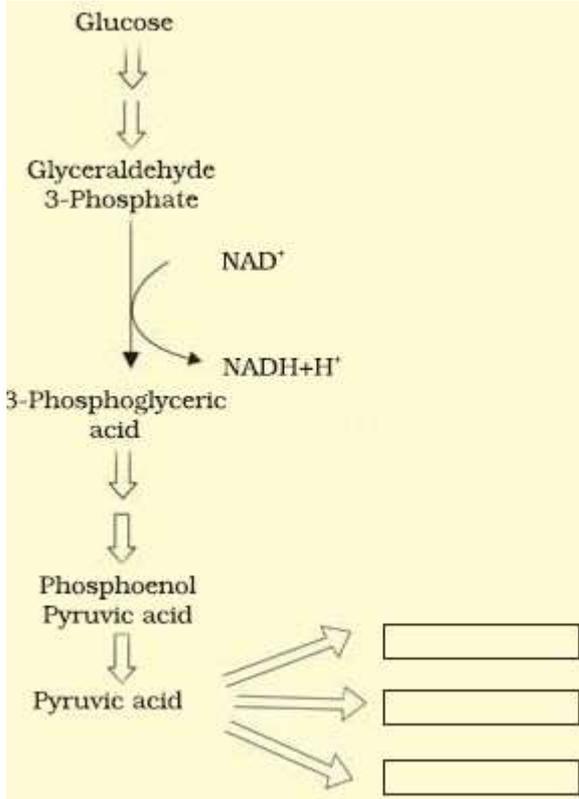
Very Short Answer Type Questions

1. Energy is released during the oxidation of compounds in respiration. How is this energy stored and released as and when it is needed?
2. Explain the term “Energy Currency”. Which substance acts as energy currency in plants and animals?
3. Different substrates get oxidized during respiration. How does Respiratory Quotient (RQ) indicate which type of substrate, i.e., carbohydrate, fat or protein is getting oxidized?
 $R.Q = (A/B)$
 What do A and B stand for?
 What type of substrates have R.Q. of 1, < 1 or > 1?
4. Fo-F1 particles participate in the synthesis of _____.
5. When does anaerobic respiration occur in man and yeast?
6. Which of the following will release more energy on oxidation? Arrange them in ascending order.
 - a. 1 gm of fat
 - b. 1 gm of protein
 - c. 1 gm of glucose
 - d. 0.5 g of protein + 0.5g glucose
7. The product of aerobic glycolysis in skeletal muscle and anaerobic fermentation in yeast are respectively _____ and _____.

Short Answer Type Questions

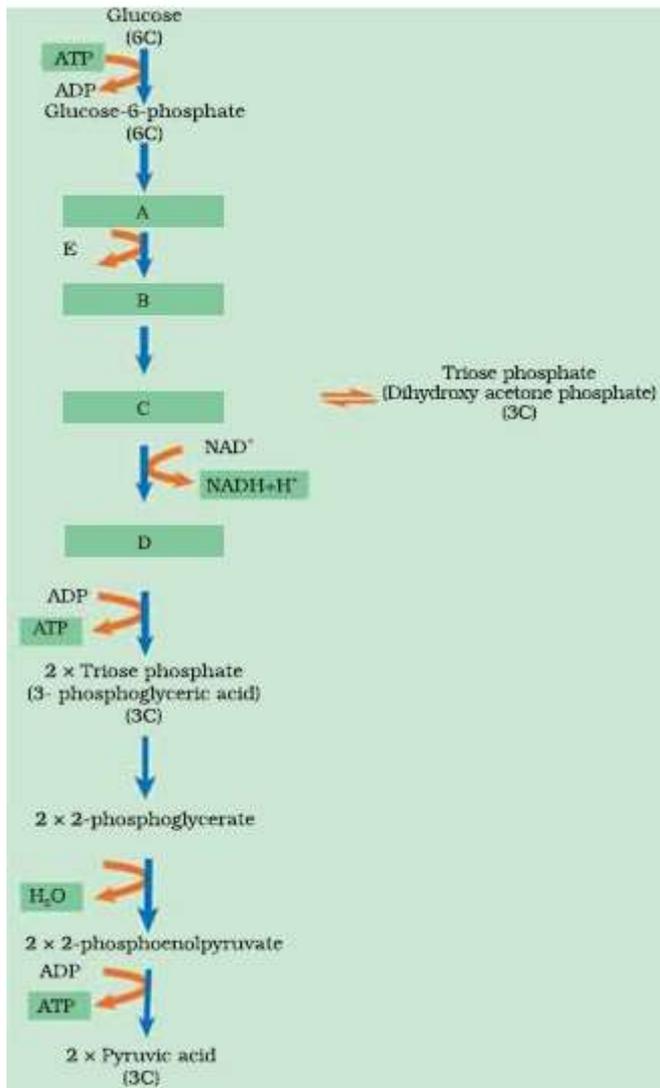
1. If a person is feeling dizzy, glucose or fruit juice is given immediately but not a cheese sandwich, which might have more energy. Explain.
2. What is meant by the statement “aerobic respiration is more efficient.”?

3. Pyruvic acid is the end product of glycolysis. What are the three metabolic fates of pyruvic acid under aerobic and anaerobic conditions? Write in the space provided in the diagram.



4. The energy yield in terms of ATP is higher in aerobic respiration than during anaerobic respiration. Why is there anaerobic respiration even in organisms that live in aerobic condition like human beings and angiosperms?
5. Oxygen is an essential requirement for aerobic respiration but it enters the respiratory process at the end? Discuss.
6. Respiration is an energy releasing and enzymatically controlled catabolic process which involves a step-wise oxidative breakdown of organic substances inside living cells.
In this statement about respiration explain the meaning of 1) Step-wise oxidative breakdown 2) Organic substances (used as substrates).
7. Comment on the statement – Respiration is an energy producing process but ATP is being used in some steps of the process.

8. The figure given below shows the steps in glycolysis. Fill in the missing steps A, B, C, D and also indicate whether ATP is being used up or released at step E?



9. Why is respiratory pathway referred to as an amphibolic pathway? Explain.
10. We commonly call ATP as the energy currency of the cell. Can you think of some other energy carriers present in a cell? Name any two.
11. ATP produced during glycolysis is a result of substrate level phosphorylation. Explain.
12. Do you know any step in the TCA cycle where there is substrate level phosphorylation. Which one?
13. In a way green plants and cyanobacteria have synthesized all the food on the earth. Comment.
14. When a substrate is being metabolized, why does not all the energy that is produced get released in one step. It is released in multiple steps. What is the advantage of step-wise release?
15. Respiration requires O₂. How did the first cells on the earth manage to survive in an atmosphere that lacked O₂?
16. It is known that red muscle fibres in animals can work for longer periods of time continuously. How is this possible?
17. The energy yield in terms of ATP is higher in aerobic respiration than during anaerobic respiration. Explain.
18. RuBP carboxylase, PEPcase, Pyruvate dehydrogenase, ATPase, cytochrome oxidase, Hexokinase, Lactate dehydrogenase.
Select/choose enzymes from the list above which are involved in
- a. Photosynthesis
 - b. Respiration

- c. Both in photosynthesis and respiration

19. How does a tree trunk exchange gases with the environment although it lacks stomata?

20. Write two energy yielding reactions of glycolysis.

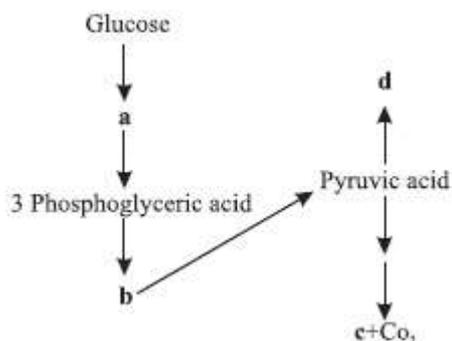
21. Name the site (s) of pyruvate synthesis. Also, write the chemical reaction wherein pyruvic acid dehydrogenase acts as a catalyst.

22. Mention the important series of events of aerobic respiration that occur in the matrix of the mitochondrion as well as one that take place in inner membrane of the mitochondrion.

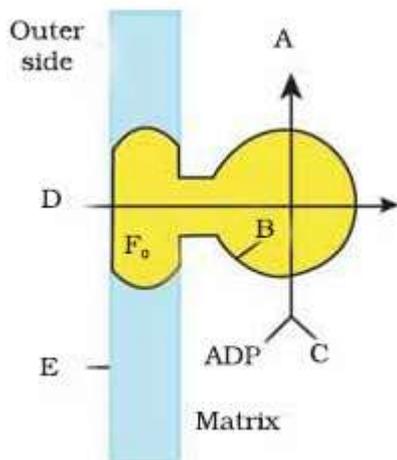
23. Respiratory pathway is believed to be a catabolic pathway. However, nature of TCA cycle is amphibolic. Explain.

Long Answer Type Questions

1. In the following flow chart, replace the symbols a,b,c and d with appropriate terms. Briefly explain the process and give any two application of it.



2. Given below is a diagram showing ATP synthesis during aerobic respiration, replace the symbols A, B, C, D and E by appropriate terms given in the box.



F₁, Particle, Pi, 2H⁺, Inner mitochondrial membrane, ATP, F₀ particle, ADP

3. Oxygen is critical for aerobic respiration. Explain its role with respect to ETS.
4. Enumerate the assumptions that we undertake in making the respiratory balance sheet. Are these assumptions valid for a living system? Compare fermentation and aerobic respiration in this context.
5. Give an account of Glycolysis. Where does it occur? What are the end products? Trace the fate of these products in both aerobic and anaerobic respiration.

Chapter-15 Plant growth & Development

Multiple Choice Questions

1. Ethylene is used for
 - a. Retarding ripening of tomatoes
 - b. Hastening of ripening of fruits
 - c. Slowing down ripening of apples
 - d. Both b and c
2. Coconut milk contains
 - a. ABA
 - b. Auxin
 - c. Cytokinin
 - d. Gibberellin
3. The affect of apical dominance can be overcome by which of the following hormone:
 - a. IAA
 - b. Ethylene
 - c. Gibberellin
 - d. Cytokinin

4. Match the following:

- | | |
|---------------|-----------------------|
| A. IAA | i. Herring sperm DNA |
| B. ABA | ii. Bolting |
| C. Ethylene | iii. Stomatal closure |
| D. GA | iv. Weed-free lawns |
| E. Cytokinins | v. Ripening of fruits |

Options:

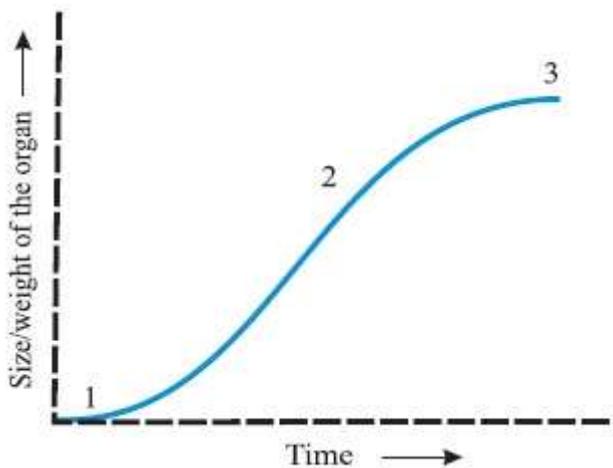
- a A – iv, B – iii, C – v, D – ii, E – i
 - b A – v, B – iii, C – iv, D – ii, E – i
 - c A – iv, B – i, C – iv, D – iii, E – ii
 - d A – v, B – iii, C – ii, D – i, E – iv
5. Apples are generally wrapped in waxed paper to
 - a. Prevent sunlight for changing its colour
 - b. Prevent aerobic respiration by checking the entry of O₂.
 - c. Prevent ethylene formation due to injury
 - d. Make the apples look attractive
 6. Growth can be measured in various ways. Which of these can be used as parameters to measure growth
 - a. Increase in cell number
 - b. Increase in cell size
 - c. Increase in length and weight
 - d. All the above
 7. The term synergistic action of hormones refers to
 - a. When two hormones act together but bring about opposite effects.
 - b. When two hormones act together and contribute to the same function.
 - c. When one hormone affects more than one function.
 - d. When many hormones bring about any one function.

8. Plasticity in plant growth means that
- a. Plant roots are extensible
 - b. Plant growth is dependent on the environment
 - c. Stems can extend
 - d. None of the above
9. To increase sugar production in sugarcanes, they are sprayed with
- a. IAA
 - b. Cytokinin
 - c. Gibberellin
 - d. Ethylene
10. ABA acts antagonistic to
- a. Ethylene
 - b. Cytokinin
 - c. Gibberellic acid
 - d. IAA
11. Monocarpic plants are those which
- a. Bear flowers with one ovary
 - b. Flower once and die
 - c. Bear only one flower
 - d. All of the above
12. The photoperiod in plants is perceived at
- a. Meristem
 - b. Flower
 - c. Floral buds
 - d. Leaves

Very Short Answer Type Questions

1. Fill in the places with appropriate word/ words.
- a. A phase of growth which is maximum and fastest is _____.
 - b. Apical dominance as expressed in dicotyledonous plants is due to the presence of more _____ in the apical bud than in the lateral ones.
 - c. In addition to auxin, a _____ must be supplied to culture medium to obtain a good callus in plant tissue culture.
 - d. _____ of a vegetative plants are the sites of photoperiodic perception.
2. Plant growth substances (PGS) have innumerable practical applications. Name the PGS you should use to
- a. Increase yield of sugar cane.
 - b. Promote lateral shoot growth.
 - c. Cause sprouting of potato tuber.
 - d. Inhibit seed germination.

3. A primary root grows from 5 cm to 19 cm in a week. Calculate the growth rate and relative growth rate over the period.
4. Gibberellins were first discovered in Japan when rice plants were suffering from bakane (the foolish seedling disease) caused by a fungus *Gibberella fujikuroi*.
 - a. Give two functions of this phytohormone.
 - b. Which property of Gibberellin caused foolish seedling disease in rice?
5. Gibberellins promote the formation of _____ flowers on genetically _____ plants in Cannabis whereas ethylene promotes formation of _____ flowers on genetically _____ plants.
6. Classify the following plants into Long-Day Plants (LDP), Short Day Plants (SDP) and Day Neutral Plants (DNP) Xanthium, Henbane (*Hyoscyamus niger*), Spinach, Rice, Strawberry, Bryophyllum, Sunflower, Tomato, Maize.
7. A farmer grows cucumber plants in his field. He wants to increase the number of female flowers in them. Which plant growth regulator can be applied to achieve this?
8. Where are the following hormones synthesized in plants
 - a. IAA
 - b. Gibberellins
 - c. Cytokinins
9. In botanical gardens and tea gardens, gardeners trim the plants regularly so that they remain bushy. Does this practice have any scientific explanation?
10. Light plays an important role in the life of all organism. Name any three physiological processes in plants which are affected by light.
11. In the figure of Sigmoid growth curve given below, label segments 1, 2 and 3.

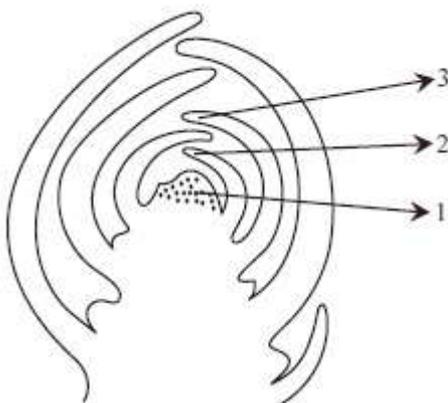


12. Growth is one of the characteristic of all living organism? Do unicellular organism also grow? If so, what are the parameters?
13. The rice seedlings infected with fungus *Gibberella fujikuroi* is called foolish seedlings? What was the reason behind it?

Short Answer Type Questions

1. *Nicotiana tabacum*, a Short Day Plant, when exposed to more than critical period of light fails to flower. Explain.
2. What are the structural characteristics of
 - a. Meristematic cells near root tip
 - b. The cells in the elongation zone of the root

3. Does the growth pattern in plants differ from that in animals? Do all the parts of plant grow indefinitely? If not, name the regions of plant, which can grow indefinitely.
4. Explain in 2-3 lines each of the following terms with the help of examples taken from different plant tissues
 - a. Differentiation
 - b. De-differentiation
 - c. Redifferentiation
5. Auxins are growth hormones capable of promoting cell elongation. They have been used in horticulture to promote growth, flowering and rooting. Write a line to explain the meaning of the following terms related to auxins.
 - a. auxin precursors
 - b. anti-auxins
 - c. synthetic auxins
6. The role of ethylene and abscisic acid is both positive and negative. Justify the statement.
7. While experimentation, why do you think it is difficult to assign any affect seen to any single hormone?
8. What is the mechanism underlying the phenomenon by which the terminal/apical bud suppresses the growth of lateral buds? Suggest measures to overcome this phenomenon.
9. In animals there are special glands secreting hormones, whereas there are no glands in plants. Where are plant hormones formed? How are the hormones translocated to the site of activity?
10. Many discoveries in science have been accidental. This is true for plant hormones also. Can you justify this statement by giving an example? Also what term is used for such accidental findings?
11. To get a carpet like grass lawns are mowed regularly. Is there any scientific explanation for this?
12. In a slide showing different types of cells can you identify which type of the cell may be meristematic and the one which is incapable of dividing and how?
13. A rubber band stretches and reverts back to its original position. Bubble gum stretches, but it would not return to its original position. Is there any difference between the two processes? Discuss it with respect to plant growth (Hint: Elasticity (reversible) Plasticity (irreversible))
14. Label the diagram



- a. This is which part of a dicotyledonous plant?
 - b. If we remove part 1 from the plant, what will happen?
15. Both animals and plants grow. Why do we say that growth and differentiation in plants is open and not so in animals? Does this statement hold true for sponges also?
 16. Define parthenocarpy. Name the plant hormone used to induce parthenocarpy.

17. While eating watermelons, all of us wish it was seedless. As a plant physiologist can you suggest any method by which this can be achieved.
18. A gardener finds some broad-leaved dicot weeds growing in his lawns. What can be done to get rid of the weeds efficiently?
19. On germination a seed first produces shoots with leaves, flowers appear later,
 - a. Why do you think this happens?
 - b. How is this advantageous to the plant?
20. Fill in the blanks:
 - a. Maximum growth is observed in _____ phase.
 - b. Apical dominance is due to _____
 - c. _____ initiate rooting
 - d. Pigment involved in Photoperception in flowering plants is _____

Long Answer Type Questions

1. Some varieties of wheat are known as spring wheat while others are called winter wheat. Former variety is sown, and planted in spring and is harvested by the end of the same season. However, winter varieties, if planted in spring, fail to flower or produce mature grains within a span of a flowering season. Explain, why?
2. It is known that some varieties of wheat are sown in autumn but are harvested around next mid summer.
 - a. What could be the probable reason for this?
 - b. What term is used for this promotion of flowering under low temperature?
 - c. Which plant hormone can replace the cold treatment?
3. Name a hormone which
 - a. is gaseous in nature
 - b. is responsible for phototropism
 - c. induces femaleness in flowers of cucumber
 - d. is used for killing weeds (dicots)
 - e. induces flowering in long day plants

Chapter-16 **DIGESTION AND ABSORPTION**

Multiple Choice Questions

1. Select what is not true of intestinal villi among followings
 - a. They possess microvilli
 - b. They increase the surface area
 - c. They are supplied with capillaries and the lacteal vessels
 - d. They only participate in digestion of fats
2. Hepato-pancreatic duct opens into the duodenum and carries
 - a. Bile
 - b. Pancreatic juice

- c. Both bile and pancreatic juice
 - d. Saliva
3. One of the following is not a common disorder associated with digestive system
 - a. Tetanus
 - b. Diarrhoea
 - c. Jaundice
 - d. Dysentery
 4. A gland not associated with the alimentary canal is
 - a. Pancreas
 - b. Adrenal
 - c. Liver
 - d. Salivary glands
 5. Match the two columns and select the correct among options given
 6. Match the two columns and select the right one among options given
 7. Match the enzyme with their respective substrate and choose the right one among options given
 8. Dental formula in human beings is
 9. Liver is the largest gland and is associated with various functions, choose one which is not correct
 - a. Metabolism of carbohydrate
 - b. Digestion of fat
 - c. Formation of bile
 - d. Secretion of hormone called gastric
 10. Mark the right statement among the following
 - a. Trypsinogen is an inactive enzyme
 - b. Trypsinogen is secreted by intestinal mucosa
 - c. Enterokinase is secreted by pancreas
 - d. Bile contains trypsin

Very Short Answer Type Questions

1. The food mixes thoroughly with the acidic gastric juice of the stomach by the churning movements of its muscular wall. What do we call the food then?
2. Trypsinogen is an inactive enzyme of pancreatic juice. An enzyme, enterokinase, activates it. Which tissue/cells secrete this enzyme?/ How is it activated?
3. In which part of alimentary canal does absorption of water, simple sugars and alcohol takes place?
4. Name the enzymes involved in the breakdown of nucleotides into sugars and bases?
5. Define digestion in one sentence.

6. What do we call the type of teeth attachment to jaw bones in which each tooth is embedded in a socket of jaws bones?
7. Stomach is located in upper left portion of the abdominal cavity and has three major parts. Name these three parts.
8. Does gall bladder make bile?
9. Correct the following statements by deleting one of entries (given in bold).
 - a. Goblet cells are located in the intestinal mucosal epithelium and secrete chymotrypsin / mucus.
 - b. Fats are broken down into di- and monoglycerides with the help of amylase/ lipases.
 - c. Gastric glands of stomach mucosa have oxyntic cell / chief cells which secrete HCl.
 - d. Saliva contains enzymes that digest starch /protein.

Short Answer Type Questions

1. What is pancreas? Mention the major secretions of pancreas that are helpful in digestion.
2. Name the part of the alimentary canal where major absorption of digested food takes place. What are the absorbed forms of different kinds of food materials?
3. List the organs of human alimentary canal and name the major digestive glands with their location.
4. What is the role of gall bladder? What may happen if it stops functioning or is removed?
5. Correct the statement given below by the right option shown in the bracket against them
 - a. Absorption of amino acids and glycerol takes place in the. (small intestine/ large intestine)
 - b. The faeces in the rectum initiate a reflex causing an urge for its removal. (neural /hormonal)
 - c. Skin and eyes turn yellow in infection. (liver /stomach)
 - d. Rennin is a proteolytic enzyme found in gastric juice in (infants / adults).
 - e. Pancreatic juice and bile are released through. (intestine- pancreatic/ hepato- pancreatic duct)
 - f. Dipeptides, disaccharides and glycerides are broken down into simple substances in region of small intestine. (jejunum/ duodenum)
6. What are three major types of cells found in the gastric glands? Name their secretions.
7. How is the intestinal mucosa protected from the acidic food entering from stomach?
8. How are the activities of gastro-intestinal tract regulated?
9. Distinguish between constipation and indigestion. Mention their major causes.
10. Describe the enzymatic action on fats in the duodenum.

Long Answer Type Questions

1. A person had roti and dal for his lunch. Trace the changes in those during its passage through the alimentary canal.
2. What are the various enzymatic types of glandular secretions in our gut helping digestion of food? What is the nature of end products obtained after complete digestion of food?
3. Discuss mechanisms of absorption.
4. Discuss the role of hepato – pancreatic complex in digestion of carbohydrate, protein and fat components of food.
5. Explain the process of digestion in the buccal cavity with a note on the arrangement of teeth.

Chapter-17

BREATHING AND EXCHANGE OF GASES

Multiple Choice Questions

1. Respiration in insects is called direct because
 - a. The tissues exchange O_2 / CO_2 directly with the air in the tubes
 - b. The tissues exchange O_2 / CO_2 directly with coelomic fluid
 - c. The tissues exchange O_2 / CO_2 directly with the air outside through body surface
 - d. Tracheal tubes exchange O_2 / CO_2 directly with the haemocoel which then exchange with tissues
2. Regarding the functions of our respiratory system, mark the wrong entry.
 - a. Humidifies the air
 - b. Warms up the air
 - c. Diffusion of gases
 - d. Cleans up the air
3. A person suffers punctures in his chest cavity in an accident, without any damage to the lungs its effect could be
 - a. Reduced breathing rate
 - b. Rapid increase in breathing rate
 - c. No change in respiration
 - d. Cessation of breathing
4. It is known that exposure to carbon monoxide is harmful to animals because
 - a. It reduces CO_2 transport
 - b. It reduces O_2 transport
 - c. It increases CO_2 transport
 - d. It destroys hemoglobin
5. Mark the true statement among the following with reference to normal breathing
 - a. Inspiration is a passive process where as expiration is active
 - b. Inspiration is a active process where as expiration is passive
 - c. Inspiration and expiration are active processes
 - d. Inspiration and expiration are passive processes
6. A person breathes in some volume of air by forced inspiration after having a forced expiration. This quantity of air taken in is
 - a. Total lung capacity
 - b. Tidal volume
 - c. Vital capacity
 - d. Inspiratory capacity
7. Mark the incorrect statement in context to O_2 binding to Hb
 - a. Higher pH
 - b. Lower temperature
 - c. Lower pCO_2
 - d. Higher PO_2

8. Mark the correct pair of muscles involved in the normal breathing in humans
- a. External and internal intercostal muscles
 - b. Diaphragm and abdominal muscles
 - c. Diaphragm and external intercostal muscles
 - d. Diaphragm and internal intercostal muscles
9. Incidence of Emphysema – a respiratory disorder is high in cigarette smokers. In such cases
- a. The bronchioles are found damaged
 - b. The alveolar walls are found damaged
 - c. The plasma membrane is found damaged
 - d. The respiratory muscles are found damaged
10. Respiratory process is regulated by certain specialized centres in the brain. One of the following listed centres can reduce the inspiratory duration upon stimulation
- a. Medullary inspiratory centre
 - b. Pneumotaxic centre
 - c. Apneustic centre
 - d. Chemosensitive centre
11. CO₂ dissociates from carbamino haemoglobin when
- a. pCO₂ is high & pO₂ is low
 - b. pO₂ is high and pCO₂ is low
 - c. pCO₂ and pO₂ are equal
 - d. None of the above
12. In breathing movements, air volume can be estimated by
- a. Stethoscope
 - b. Hygrometer
 - c. Sphygmomanometer
 - d. Spirometer
13. Identify the correct and incorrect match about respiratory volume and capacities and mark the correct answer
- i. Inspiratory capacity (IC) = Tidal Volume + Residual Volume
 - ii. Vital Capacity (VC) = Tidal Volume (TV) + Inspiratory Reserve Volume (IRV) + Expiratory Reserve Volume (ERV).
 - iii. Residual Volume (RV) = Vital Capacity (VC) – Inspiratory Reserve Volume (IRV)
 - iv. Tidal Volume (TV) = Inspiratory Capacity (IC) – Inspiratory Reserve Volume (IRV)
- Options:**
- a. (i) Incorrect, (ii) Incorrect, (iii) Incorrect, (iv) Correct
 - b. (i) Incorrect, (ii) Correct, (iii) Incorrect, (iv) Correct
 - c. (i) Correct, (ii) Correct, (iii) Incorrect, (iv) Correct
 - d. (i) Correct, (ii) Incorrect, (iii) Correct, (iv) Incorrect
14. The oxygen – haemoglobin dissociation curve will show a right shift in case of
- a. High pCO₂
 - b. High pO₂
 - c. Low pCO₂
 - d. Less H⁺ concentration

15. Match the following and mark the correct options

Animal	Respiratory Organ
A. Earthworm	i. Moist cuticle
B. Aquatic Arthropods	ii. Gills
C. Fishes	iii. Lungs
D. Birds/Reptiles	iv. Trachea

Options:

- a. A-ii, B-i, C-iv, D-iii
- b. A-i, B-iv, C-ii, D-iii
- c. A-i, B-iii, C-ii, D-iv
- d. A-i, B-ii, C-i.v, D-iii

Very Short Answer Type Questions

1. Define the following terms?

- a. Tidal volume
- b. Residual volume
- c. Asthma

2. A fluid filled double membranous layer surrounds the lungs. Name it and mention its important function.

3. Name the primary site of exchange of gases in our body?

4. Cigarette smoking causes emphysema. Give reason.

5. What is the amount of O₂ supplied to tissues through every 100 ml. of oxygenated blood under normal physiological conditions?

6. A major percentage (97%) of O₂ is transported by RBCs in the blood. How does the remaining percentage (3%) of O₂ transported?

7. Arrange the following terms based on their volumes in an ascending order

- a. Tidal Volume (TV)
- b. Residual Volume (RV)
- c. Inspiratory Reserve Volume (IRV)
- d. Expiratory Capacity (EC)

8. Complete the missing terms

- a. Inspiratory Capacity (IC) = _____ + IRV
- b. _____ = TV + ERV
- c. Functional Residual Capacity (FRC) = ERV + _____

9. Name the organs of respiration in the following organisms:

- a. Flatworm - _____
- b. Birds - _____
- c. Frog - _____
- d. Cockroach - _____

10. Name the important parts involved in creating a pressure gradient between lungs and the atmosphere during normal respiration.

Short Answer Type Questions

1. State the different modes of CO₂ transport in blood.

2. Compared to O₂, diffusion rate of CO₂ through the diffusion membrane per unit difference in partial pressure is much higher. Explain.
3. For completion of respiration process, write the given steps in sequential manner
 - a. Diffusion of gases (O₂ and CO₂) across alveolar membrane.
 - b. Transport of gases by blood.
 - c. Utilisation of O₂ by the cells for catabolic reactions and resultant release of CO₂.
 - d. Pulmonary ventilation by which atmospheric air is drawn in and CO₂ rich alveolar air is released out.
 - e. Diffusion of O₂ and CO₂ between blood and tissues.
4. Differentiate between
 - a. Inspiratory and expiratory reserve volume
 - b. Vital capacity and total lung capacity
 - c. Emphysema and occupational respiratory disorder

Long Answer Type Questions

1. Explain the transport of O₂ and CO₂ between alveoli and tissue with diagram.
2. Explain the mechanism of breathing with neat labelled sketches.
3. Explain the role of neural system in regulation of respiration.

Chapter-18 **BODY FLUIDS AND CIRCULATION**

Multiple Choice Questions

1. Mark, among the following a cell which does not exhibit phagocytic activity
 - a. Monocytes
 - b. Neutrophil
 - c. Basophil
 - d. Macrophage
2. One of the common symptoms observed in people infected with Dengue fever is
 - a. Significant decrease in RBC count
 - b. Significant decrease in WBC count
 - c. Significant decrease in platelets count
 - d. Significant increase in platelets count
3. Which among the followings is correct during each cardiac cycle?
 - a. The volume of blood pumped out by the Rt and Lt ventricles is same.
 - b. The volume of blood pumped out by the Rt and Lt ventricles is different
 - c. The volume of blood received by each atrium is different
 - d. The volume of blood received by the aorta and pulmonary artery is different
4. Cardiac activity could be moderated by the autonomous neural system.
Tick the correct answer:
 - a. The parasympathetic system stimulates heart rate and stroke volume
 - b. The sympathetic system stimulates heart rate and stroke volume
 - c. The parasympathetic system decreases the heart rate but increase stroke volume

- d. The sympathetic system decreases the heart rate but increase stroke volume
5. Mark the pair of substances among the following which is essential for coagulation of blood.
- a. Heparin and calcium ions
 - b. Calcium ions and platelet factors
 - c. Oxalates and citrates
 - d. Platelet factors and heparin
6. ECG depicts the depolarisation and repolarisation processes during the cardiac cycle. In the ECG of a normal healthy individual one of the following waves is not represented.
- a. Depolarisation of atria
 - b. Repolarisation of atria
 - c. Depolarisation of ventricles
 - d. Repolarisation of ventricles
7. Which one of the following type of cells lack nucleus?
- a. RBC
 - b. Neutrophils
 - c. Eosinophils
 - d. Monocytes
8. Which one of the following blood cells is involved in antibody production.
- a. B-Lymphocytes
 - b. T-Lymphocytes
 - c. RBC
 - d. Neutrophils
9. The cardiac impulse is initiated and conducted further upto ventricle.
The correct sequence of conduction of impulse is
- | | | | | |
|----|----------|----------------|----------------|----------------|
| a. | S A Node | A V Node | Purkinje fiber | A V Bundle |
| b. | S A Node | Purkinje fiber | A V Node | A V Bundle |
| c. | S A Node | A V Node | A V Bundle | Purkinje fiber |
| d. | S A Node | Purkinje fiber | A V Bundle | A V Node |
10. The cells involved in inflammatory reactions are
- a. Basophils
 - b. Neutrophils
 - c. Eosinophils
 - d. Lymphocytes
11. The second heart sound (dubb) is associated with the closure of
- a. Tricuspid valve
 - b. Semilunar valves
 - c. Bicuspid valve
 - d. Tricuspid and bicuspid valves.
12. Which of the following correctly explains a phase/ event in cardiac cycle in a standard electrocardiogram?
- a. QRS complex indicates atrial contraction.

- b. QRS complex indicates ventricular contraction.
 - c. Time between S and T represents atrial systole.
 - d. P-wave indicates beginning of ventricular contraction.
13. Which of the following statements is incorrect?
- a. A person of 'O' blood group has anti 'A' and anti 'B' antibodies in his blood plasma.
 - b. A person of 'B' blood group can't donate blood to a person of 'A' blood group.
 - c. Blood group is designated on the basis of the presence of antibodies in the blood plasma.
 - d. A person of AB blood group is universal recipient.
14. What would be the cardiac output of a person having 72 heart beats per minute and a stroke volume of 50 ml?
- a. 360 mL
 - b. 3600 mL
 - c. 7200 mL
 - d. 5000 mL
15. Match the terms given under Column 'A' with their functions given under Column 'B' and select the answer from the options given below:
- | Column A | Column B |
|---------------------|---|
| A. Lymphatic System | i. Carries oxygenated blood |
| B. Pulmonary vein | ii. Immune Response |
| C. Thrombocytes | iii. To drain back the tissue fluid to the circulatory system |
| D. Lymphocytes | iv. Coagulation of blood |
- Options:**
- a. A-ii, B-i, C-iii, D-iv
 - b. A-iii, B-i, C-iv, D-ii
 - c. A-iii, B-i, C-iii, D-iv
 - d. A-ii, B-i, C-iii, D-iv
16. Read the following statements and choose the correct option
- Statement 1 : Atria receive blood from all parts of the body which subsequently flows to ventricles.
Statement 2 : Action potential generated at sino-atrial node passes from atria to ventricles.
- a. Action mentioned in Statement 1 is dependent on action mentioned in Statement 2
 - b. Action mentioned in Statement 2 is dependent on action mentioned in Statement 1
 - c. Action mentioned in Statements 1 and 2 are independent of each other.
 - d. Action mentioned in Statements 1 and 2 are synchronous.

Very Short Answer Type Questions

1. Name the blood component which is viscous and straw coloured fluid.
2. Complete the missing word in the statement given below:
 - a. Plasma without _____ factors is called serum.
 - b. _____ and monocytes are phagocytic cells.
 - c. Eosinophils are associated with _____ reactions.
 - d. _____ ions play a significant role in clotting.

- e. One can determine the heart beat rate by counting the number of _____ in an ECG.
3. Given below is the diagrammatic representation of a standard ECG. Label its different peaks.



4. Name the vascular connection that exists between the digestive tract and liver.
5. Given below are the abnormal conditions related to blood circulation. Name the disorders.
- a. Acute chest pain due to failure of O₂ supply to heart muscles
 - b. Increased systolic pressure
6. Which coronary artery disease is caused due to narrowing of the lumen of arteries?
7. Define the following terms and give their location?
- a. Purkinje fibre
 - b. Bundle of His
8. State the functions of the following in blood
- a. Fibrinogen
 - b. Globulin
 - c. Neutrophils
 - d. Lymphocytes
9. What physiological circumstances lead to erythroblastosis fetalis?
10. Explain the consequences of a situation in which blood does not coagulate.
11. What is the significance of time gap in the passage of action potential from sino-atrial node to the ventricle?
12. How will you interpret an electrocardiogram (ECG) in which time taken in QRS complex is higher.

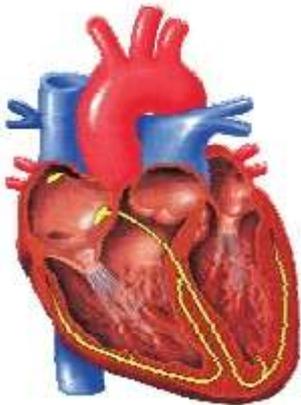
Short Answer Type Questions

1. The walls of ventricles are much thicker than atria. Explain.
2. Differentiate between
- a. Blood and Lymph
 - b. Basophils and Eosinophils
 - c. Tricuspid and bicuspid valve
3. Briefly describe the followings:
- a. Anaemia
 - b. Angina Pectoris
 - c. Atherosclerosis
 - d. Hypertension
 - e. Heart failure
 - f. Erythroblastosis fetalis

4. Explain the advantage of the complete partition of ventricle among birds and mammals and hence leading to double circulation.
5. What is the significance of hepatic portal system in the circulatory system?
6. Explain the functional significance of lymphatic system?
7. Write the features that distinguish between the two
 - a. Plasma and Serum
 - b. Open and closed circulatory system
 - c. Sino-atrial node and Atrio-ventricular node
8. Thrombocytes are essential for coagulation of blood. Comment.
9. Answer the following
 - a. Name the major site where RBCs are formed.
 - b. Which part of heart is responsible for initiating and maintaining its rhythmic activity?
 - c. What is specific in the heart of crocodiles among reptilians?

Long Answer Type Questions

1. Explain Rh-incompatibility in humans.
2. Describe the events in cardiac cycle. Explain “double circulation”.
3. Explain different types of blood groups and donor compatibility by making a table.
4. Write short note on the following
 - a. Hypertension
 - b. Coronary Artery Disease
5. In the diagrammatic presentation of heart given below, mark and label, SAN, AVN, AV bundles, bundle of His and Purkinje fibres.



Chapter-19

EXCRETORY PRODUCTS AND

THEIR ELIMINATION

Multiple Choice Questions

1. The following substances are the excretory products in animals. Choose the least toxic form among them?
 - a. Urea
 - b. Uric acid
 - c. Ammonia
 - d. Carbon dioxide
2. Filtration of the blood takes place at
 - a. PCT
 - b. DCT
 - c. Collecting ducts
 - d. Malpighian body
3. Which of the following statements is incorrect
 - a. ADH – prevents conversion of angiotensinogen in blood to angiotensin
 - b. Aldosterone – facilitates water reabsorption
 - c. ANF – enhances sodium reabsorption
 - d. Renin – causes vasodilation
4. A large quantity of one of the following is removed from our body by lungs.
 - a. CO₂ only
 - b. H₂O only
 - c. CO₂ and H₂O
 - d. ammonia
5. The pH of human urine is approximately
 - a. 6.5
 - b. 7
 - c. 6
 - d. 7.5

6. Different types of excretory structures and animals are given below. Match them appropriately and mark the correct answer from among those given below:

Excretory structure/ organ	Animals
A. protonephridia	i. Prawn
B. Nephridia	ii. Cockroach
C. Malpighian tabules	iii. Earthworm
D. Green gland or Antennal gland	iv. Flatworms

- a. (D) i, (C) ii, (B) iii and (A) iv
 - b. (B) i, (C) ii, (A) iii and (B) iv
 - c. (D) i, (C) ii, (A) iii and (B) iv
 - d. (B) i, (C) ii, (B) iii and (D) iv
7. Which one of the following statements is incorrect?
 - a. Birds and land snails are uricotelic animals.
 - b. Mammals and frogs are ureotelic animals
 - c. Aquatic amphibians and aquatic insects are ammonotelic animals
 - d. Birds and reptiles are ureotelic

8. Which of the following pairs is wrong?

- a. Uricotelic ———- Birds
- b. Ureotelic ———- Insects
- c. Ammonotelic ———- Tadpole
- d. Ureotelic ———- Elephant

9. Which one of the following statements is incorrect?

- a. The medullary zone of kidney is divided into a few conical masses called medullary pyramids projecting into the calyces.
- b. Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis.
- c. Glomerulus alongwith Bowman's capsule is called the renal corpuscle.
- d. Renal corpuscle, proximal convoluted tubule (PCT) and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of kidney

10. The condition of accumulation of urea in the blood is termed as

- a. Renal Calculi
- b. Glomerulonephritis
- c. Uremia
- d. Ketonuria

11. Which one of the following is also known as antidiuretic hormone?

- a. Oxytocin
- b. Vasopressin
- c. Adrenaline
- d. Calcitonin

12. Match the terms given in Column I with their physiological processes given in Column II and choose the correct answer

Column I	Column II
A. Proximal convoluted tubule	i. Formation of concentrated urine
B. Distal convoluted tubule	ii. Filtration of blood
C. Henle's loop	iii. Reabsorption of 70-80% of electrolytes
D. Counter-current mechanism	iv. Ionic balance
E. Renal corpuscle	v. maintenance of concentration gradient in medulla

- a. A-iii, B-v, C-iii, D-ii, E-i
- b. A-iii, B-iv, C-i, D-v, E-ii
- c. A-i, B-iii, C-ii, D-v, E-iv
- d. A-iii, B-i, C-iv, D-v, E-ii

13. Match the abnormal conditions given in Column A with their explanations given in Column B and Choose the correct option

Column A	Column B
A. Glycosurea	i. Accumulation of uric acid in joints
B. Renal calculi	ii. Inflammation in glomeruli
C. Glomerular nephritis	iii. Mass of crystallised salts within the kidney
D. Gout	iv. presence of glucose in urine

Options:

- a. A-i, B-iii, C-ii, D-iv
 - b. A-iii, B-ii, C-iv, D-i
 - c. A-iv, B-iii, C-ii, D-i
 - d. A-iv, B-ii, C-iii, D-i
14. We can produce a concentrated/ dilute urine. This is facilitated by a special mechanism. Identify the mechanism.
- a. Reabsorption from PCT
 - b. Reabsorption from Collecting Duct
 - c. Reabsorption/ Secretion in DCT
 - d. Counter current mechanism in Henle's loop/ Vasa recta
15. Dialysing unit (artificial kidney) contains a fluid which is almost same as plasma except that it has
- a. High glucose
 - b. High urea
 - c. No urea
 - d. High uric acid

Very Short Answer Type Questions

1. Where does the selective reabsorption of Glomerular filtrate take place?
2. What is the excretory product from kidneys of reptiles?
3. What is the composition of sweat produced by sweat glands?
4. Identify the glands that perform the excretory function in prawns.
5. What is the excretory structure in amoeba?
6. The following abbreviations are used in the context of excretory functions, what do they stand for?
 - a. ANF
 - b. ADH
 - c. GFR
 - d. DCT
7. Differentiate Glycosuria from Ketonuria.
8. What is the role of sebaceous glands?
9. Name two actively transported substances in Glomerular filtrate.
10. Mention any two metabolic disorders, which can be diagnosed by analysis of urine.
11. What are the main processes of urine formation?
12. Sort the following into actively or passively transported substances during reabsorption of GFR. glucose, amino acids, nitrogenous wastes, Na⁺, water
13. Complete the following:
 - a. urinary excretion = tubular reabsorption + tubular secretion –

- b. Dialysis fluid = Plasma–

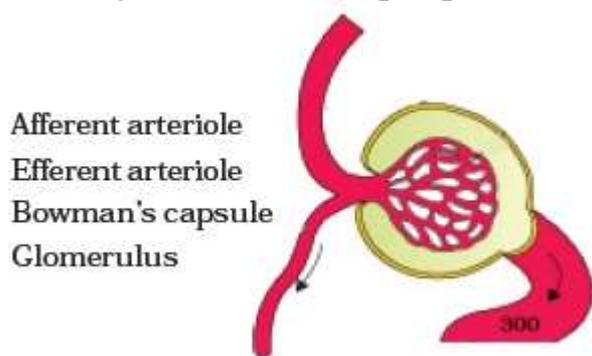
14. Mention the substances that exit from the tubules in order to maintain a concentration gradient in the medullary interstitium.

15. Fill in the blanks appropriately

Organ	Excretory wastes
a. Kidneys	_____
b. Lungs	_____
c. Liver	_____
d. Skin	_____

Short Answer Type Questions

1. Show the structure of a renal corpuscle with the help of a diagram.
2. What is the role played by Renin-Angiotensin in the regulation of kidney function?
3. Aquatic animals generally are ammonotelic in nature where as terrestrial forms are not. Comment.
4. The composition of glomerular filtrate and urine is not same. Comment.
5. What is the procedure advised for the correction of extreme renal failure?
Give a brief account of it.
6. How have the terrestrial organisms adapted themselves for conservation of water?
7. Label the parts in the following diagram.



8. Explain, why a haemodialysis unit called artificial kidney?
9. Comment upon the hormonal regulation of selective reabsorption.

Long Answer Type Questions

1. Explain the mechanism of formation of concentrated urine in mammals.
2. Draw a labelled diagram showing reabsorption and secretion of major substances at different parts of the nephron.
3. Explain briefly, micturition and disorders of the excretory system.
4. How does tubular secretion help in maintaining ionic and acid-base balance in body fluids?
5. The glomerular filtrate in the loop of Henle gets concentrated in the descending and then gets diluted in the ascending limbs. Explain.
6. Describe the structure of a human kidney with the help of a labelled diagram.

Chapter-20 **LOCOMOTION AND MOVEMENT**

Multiple Choice Questions

1. Match the following and mark the correct option

Column I	Column II
A. Fast muscle fibres	i. Myoglobin
B. Slow muscle fibres	ii. Lactic acid
C. Actin filament	iii. Contractile unit
D. Sarcomere	iv. I-band

Options:

- a. A-i, B-ii, C-iv, D-iii
 - b. A-ii, B-i, C-iii, D-iv
 - c. A-ii, B-i, C-iv, D-iii
 - d. A-iii, B-ii, C-iv, D-i
2. Ribs are attached to
- a. Scapula
 - b. Sternum
 - c. Clavicle
 - d. Ilium
3. What is the type of movable joint present between the atlas and axis?
- a. Pivot
 - b. Saddle
 - c. Hinge
 - d. Gliding
4. ATPase of the muscle is located in
- a. Actinin
 - b. Troponin
 - c. Myosin
 - d. Actin
5. Intervertebral disc is found in the vertebral column of
- a. Birds
 - b. Reptiles

- c. Mammals
 - d. Amphibians
6. Which one of the following is showing the correct sequential order of vertebrae in the vertebral column of human beings?
- a. Cervical — lumbar — thoracic — sacral — coccygeal
 - b. Cervical — thoracic — sacral — lumbar — coccygeal
 - c. Cervical — sacral — thoracic — lumbar — coccygeal
 - d. Cervical — thoracic — lumbar — sacral — coccygeal
7. Which one of the following options is incorrect?
- a. Hinge joint – between Humerus and Pectoral girdle
 - b. Pivot joint – between atlas, axis and occipital condyle
 - c. Gliding joint – between the carpals
 - d. Saddle joint – between carpel and metacarpals of thumb
8. Knee joint and elbow joints are examples of
- a. Saddle joint
 - b. Ball and socket joint
 - c. Pivot joint
 - d. Hinge joint
9. Macrophages and leukocytes exhibit
- a. Ciliary movement
 - b. Flagellar movement
 - c. Amoeboid movement
 - d. Gliding movement
10. Which one of the following is not a disorder of bone?
- a. Arthritis
 - b. Osteoporosis
 - c. Rickets
 - d. Atherosclerosis
11. Which one of the following statement is incorrect?
- a. Heart muscles are striated and involuntary
 - b. The muscles of hands and legs are striated and voluntary
 - c. The muscles located in the inner walls of alimentary canal are striated and involuntary
 - d. Muscles located in the reproductive tracts are unstriated and involuntary
12. Which one of the following statements is true:
- a. Head of humerus bone articulates with acetabulum of pectoral girdle.
 - b. Head of humerus bone articulates with glenoid cavity of pectoral girdle.
 - c. Head of humerus bone articulates with a cavity called acetabulum of pelvic girdle.
 - d. Head of humerus bone articulates with a glenoid cavity of pelvic girdle.
13. Muscles with characteristic striations and involuntary are

- a. Muscles in the wall of alimentary canal
- b. Muscles of the heart
- c. Muscles assisting locomotion
- d. Muscles of the eyelids

14. Match the followings and mark the correct option

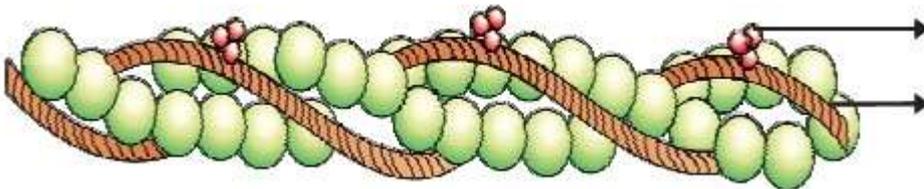
Column I	Column II
A. Sternum	i. Synovial fluid
B. Glenoid Cavity	ii. Vertebrae
C. Freely movable joint	iii. Pectoral girdle
D. Cartilagenous joint	iv. Flat bones

Options:

- a. A-ii, B-i, C-iii, D-iv
- b. A-iv, B-iii, C-i, D-ii
- c. A-ii, B-i, C-iv, D-iii
- d. A-iv, B-i, C-ii, D-iv

Very Short Answer Type Questions

1. Name the cells/tissues in human body which
 - a. exhibit ameboid movement
 - b. exhibit ciliary movement
2. Locomotion requires a perfect coordinated activity of muscular, _____, _____ systems
3. Sarcolemma, sarcoplasm and sarcoplasmic reticulum refer to a particular type of cell in our body. Which is this cell and to what parts of that cell do these names refer to?
4. Label the different components of actin filament in the diagram given below.



5. The three tiny bones present in middle ear are called ear ossicles. Write them in correct sequence beginning from ear drum.
6. What is the difference between the matrix of bones and cartilage?
7. Which tissue is afflicted by Myasthenia gravis? What is the underlying cause?
8. How do our bone joints function without grinding noise and pain?
9. Give the location of a ball and socket joint in a human body
10. Our fore arm is made of three different bones. Comment.

Short Answer Type Questions

1. With respect to rib cage, explain the following:
 - a. Bicephalic ribs
 - b. True ribs
 - c. Floating ribs

2. In old age, people often suffer from stiff and inflamed joints. What is this condition called? What are the possible reasons for these symptoms?
3. Exchange of calcium between bone and extracellular fluid takes place under the influence of certain hormones
 - a. What will happen if more of Ca^{++} is in extracellular fluid?
 - b. What will happen if very less amount of Ca^{++} is in the extracellular fluid?
4. Name atleast two hormones which result in fluctuation of Ca^{++} level.
5. Rahul exercises regularly by visiting a gymnasium. Of late he is gaining weight. What could be the reason? Choose the correct answer and elaborate.
 - a. Rahul has gained weight due to accumulation of fats in body.
 - b. Rahul has gained weight due to increased muscle and less of fat.
 - c. Rahul has gained weight because his muscle shape has improved.
 - d. Rahul has gained weight because he is accumulating water in the body.
6. Radha was running on a treadmill at a great speed for 15 minutes continuously. She stopped the treadmill and abruptly came out. For the next few minutes, she was breathing heavily/fast. Answer the following questions.
 - a. What happened to her muscles when she did strenuously exercised?
 - b. How did her breathing rate change?
7. Write a few lines about Gout.
8. What is the source of energy for muscle contraction?
9. What are the points for articulation of Pelvic and Pectoral girdles?

Long Answer Type Questions

1. Calcium ion concentration in blood affects muscle contraction. Does it lead to tetany in certain cases? How will you correlate fluctuation in blood calcium with tetany?
2. An elderly woman slipped in the bathroom and had severe pain in her lower back. After X-ray examination doctors told her it is due to a slipped disc. What does that mean? How does it affect our health
3. Explain sliding filament theory of muscle contraction with neat sketches.
4. How does a muscle shorten during its contraction and return to its original form during relaxation?
5. Discuss the role of Ca^{2+} ions in muscle contraction. Draw neat sketches to illustrate your answer.
6. Differentiate between Pectoral and Pelvic girdle.

Chapter-21

NEURAL CONTROL AND COORDINATION

Multiple Choice Questions

1. Chemicals which are released at the synaptic junction are called
 - a. Hormones
 - b. Neurotransmitters
 - c. Cerebrospinal fluid
 - d. Lymph

2. Potential difference across resting membrane is negatively charged. This is due to differential distribution of the following ions
 - a. Na⁺ and K⁺ ions
 - b. CO₃³⁺ and Cl⁻ ions
 - c. Ca⁺⁺ and Mg⁺⁺ ions
 - d. Ca⁺⁴ and Cl⁻ ions
3. Resting membrane potential is maintained by
 - a. Hormones
 - b. Neurotransmitters
 - c. Ion pumps
 - d. None of the above
4. The function of our visceral organs is controlled by
 - a. Sympathetic and somatic neural system
 - b. Sympathetic and para sympathetic neural system
 - c. Central and somatic nervous system
 - d. None of the above
5. Which of the following is not involved in Knee-jerk reflex?
 - a. Muscle spindle
 - b. Motor neuron
 - c. Brain
 - d. Inter neurons
6. An area in the brain which is associated with strong emotions is
 - a. Cerebral cortex
 - b. Cerebellum
 - c. Limbic system
 - d. Medulla
7. Mark the vitamin present in Rhodopsin
 - a. Vit A
 - b. Vit B
 - c. Vit C
 - d. Vit D
8. Human eyeball consists of three layers and it encloses
 - a. Lens, iris, optic nerve
 - b. Lens, aqueous humor and vitreous humor
 - c. Cornea, lens, iris
 - d. Cornea, lens, optic nerve
9. Wax gland present in the ear canal is called
 - a. Sweat gland
 - b. Prostate gland
 - c. Cowper's gland

- d. Sebaceous gland/ ceruminous gland
10. The part of internal ear responsible for hearing is
- a. Cochlea
 - b. Semicircular canal
 - c. Utriculus
 - d. Sacculus
11. The organ of corti is a structure present in
- a. External ear
 - b. Middle ear
 - c. Semi circular canal
 - d. Cochlea

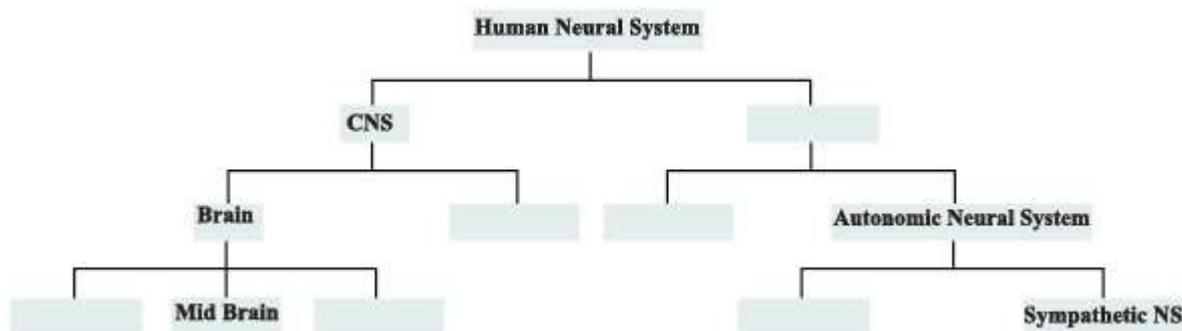
Very Short Answer Type Questions

1. Rearrange the following in the correct order of involvement in electrical impulse movement- Synaptic knob, dendrites, cell body, Axon terminal, Axon
2. Comment upon the role of ear in maintaining the balance of the body and posture.
3. Which cells of the retina enable us to see coloured objects around us?
4. Arrange the following in the order of reception and transmission of sound wave from the ear drum: Cochlear nerve, external auditory canal, ear drum, stapes, incus, malleus, cochlea.
5. During resting potential, the axonal membrane is polarised, indicate the movement of +ve and -ve ions leading to polarisation diagrammatically.
6. Name the structures involved in the protection of the brain.
7. Our reaction like aggressive behaviour, use of abusive words, restlessness etc. are regulated by brain, name the parts involved.
8. What do grey and white matter in the brain represent?
9. Where is the hunger centre located in human brain?
10. Which sensory organ is involved in vertigo (sensation of oneself or objects spinning around)?
11. While travelling at a higher altitude, a person complains of dizziness and vomiting sensation. Which part of the inner ear is disturbed during the journey?
12. Complete the statement by choosing appropriate match among the following –

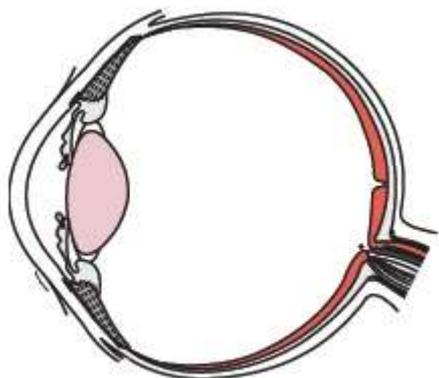
<p>a. Resting potential</p> <p>b. Nerve impulse</p> <p>c. Synaptic cleft</p> <p>d. Neurotransmitters</p>	<p>i. chemicals involved in the transmission of impulses at synapses.</p> <p>ii. gap between the pre synaptic and post synaptic neurons</p> <p>iii. electrical potential difference across the resting neural membrane</p> <p>iv. an electrical wave like response of a neuron to a stimulation.</p>
--	--

Short Answer Type Questions

- The major parts of the human neural system is depicted below. Fill in the empty boxes with appropriate words.



- What is the difference between electrical transmission and chemical transmission?
- Neural system and computers share certain common features. Comment in five lines. (Hint: CPU, input-output devices).
- If someone receives a blow on the back of neck, what would be the effect on the person's CNS?
- What is the function ascribed to Eustachian tube?
- Label the following parts in the given diagram using arrow.



- a. Aqueous chamber
- b. Cornea
- c. Lens
- d. Retina
- e. Vitreous chamber
- f. Blind spot

Long Answer Type Questions

- Explain the process of the transport and release of a neurotransmitter with the help of a labelled diagram showing a complete neuron, axon terminal and synapse.
- Name the parts of human forebrain indicating their respective functions.
- Explain the structure of middle and internal ear with the help of diagram.

Chapter-22

CHEMICAL COORDINATION AND

INTEGRATION

Multiple Choice Questions

- Select the right match of endocrine gland and their hormones among the options given below
 - Pineal
 - Thyroid
 - Ovary
 - Adrenal medulla
 - Epinephrine
 - Melatonin
 - Estrogen
 - Tetraiodothyronine

Options:

 - a. A-iv, B-ii, C-iii, D-i
 - b. A-ii, B-iv, C-i, D-iii
 - c. A-iv, B-ii, C-i, D-iii
 - d. A-ii, B-iv, C-iii, D-i
- Listed below are the hormones of anterior pituitary origin. Tick the wrong entry.
 - a. Growth hormone
 - b. Follicle stimulating hormone
 - c. Oxytocin
 - d. Adrenocorticotrophic hormone
- Mary is about to face an interview. But during the first five minutes before the interview she experiences sweating, increased rate of heart beat, respiration etc. Which hormone is responsible for her restlessness?
 - a. Estrogen and progesterone
 - b. Oxytocin and vasopressin
 - c. Adrenaline and noradrenaline
 - d. Insulin and glucagon
- The steroid responsible for balance of water and electrolytes in our body is
 - a. Insulin
 - b. Melatonin
 - c. Testosterone
 - d. Aldosterone
- Thymosin is responsible for
 - a. Raising the blood sugar level
 - b. Raising the blood calcium level
 - c. Increased production of T lymphocytes
 - d. Decrease in blood RBC
- In the mechanism of action of a protein hormone, one of the second messengers is
 - a. Cyclic AMP
 - b. Insulin
 - c. T_3
 - d. Gastrin
- Leydig cells produce a group of hormones called

- a. Androgens
 - b. Estrogens
 - c. Aldosterone
 - d. Gonadotropins
8. Corpus luteum secretes a hormone called
- a. Prolactin
 - b. Progesterone
 - c. Aldosterone
 - d. Testosterone
9. Cortisol is secreted from
- a. Pancreas
 - b. Thyroid
 - c. Adrenal
 - d. Thymus
10. A hormone responsible for normal sleep-wake cycle is
- a. Epinephrine
 - b. Gastrin
 - c. Melatonin
 - d. Insulin
11. Hormones are called chemical signals that stimulate specific target tissues. Their specificity is due to the presence of signal receiving 'receptors' only in the respective target tissues. Where are these receptors present in case of hormones of protein nature?
- a. Extra cellular matrix
 - b. Blood
 - c. Plasma membrane
 - d. Nucleus
12. Choose the correct answer among the following options
- | | |
|-------------------------------------|--|
| A. Epinephrine | i. Increase in muscle growth |
| B. Testosterone | ii. Decrease in blood pressure |
| C. Glucagon | iii. Decrease in liver glycogen content |
| D. Atrial natriuretic factor | iv. Increase heart beat |
- Options:**
- a. -ii, B-i, C-iii, D-i
 - b. A-iv, B-i, C-iii, D-ii
 - c. A-i, B-ii, C-iii, D-iv
 - d. A-i, B-iv, C-ii, D-iii
13. Blood calcium level is a resultant of how much dietary calcium is absorbed, how much calcium is lost in the urine, how much bone dissolves releasing calcium into the blood and how much calcium from blood enters tissues. A number of factors play an important role in these processes. Mark the one which has no role.
- a. Vitamin D

- b. Parathyroid hormone
 - c. Thyrocalcitonin
 - d. Thymosin
14. All the following tissues in mammals except one consists of a central ‘medullary’ region surrounded by a cortical region. Mark the wrong entry
- a. Ovary
 - b. Adrenal
 - c. Liver
 - d. Kidney
15. One of the following conditions is not linked to deficiency of thyroid hormones
- a. Cretinism
 - b. Goitre
 - c. Myxedema
 - d. Exophthalmos

Very Short Answer Type Questions

1. There are many endocrine glands in human body. Name the glands which is absent in male and the one absent in female.
2. Which of the two adrenocortical layers, zona glomerulosa and zona reticularis lies outside enveloping the other?
3. What is erythropoiesis? Which hormone stimulate it?
4. Name the only hormone secreted by pars intermedia of the pituitary gland.
5. Name the endocrine gland that produces calcitonin and mention the role played by this hormone.
6. Name the hormone that helps in cell – mediated immunity.
7. What is the role of second messenger in the mechanism of protein hormone action?
8. State whether true or false:
 - a. Gastrointestinal tract, kidney and heart also produce hormones.
 - b. Pars distalis produces six trophic hormones.
 - c. B-lymphocytes provide cell-mediated immunity.
 - d. Insulin resistance results in a disease called diabetes mellitus.
9. A patient complains of constant thirst, excessive passing of urine and low blood pressure. When the doctor checked the patients’ blood glucose and blood insulin level, the level were normal or slightly low. The doctor diagnosed the condition as diabetes insipidus. But he decided to measure one more hormone in patients blood. Which hormone does the doctor intend to measure?
10. Correct the following statements by replacing the term underlined.
 - a. Insulin is a steroid hormone.
 - b. TSH is secreted from the corpus luteum
 - c. Tetraiodothyronine is an emergency hormone.
 - d. The pineal gland is located on the anterior part of the kidney.

11. Rearrange the following hormones in Column I so as to match with their chemical nature in Column II.

Column I	Column II	
a. Oxytocin	i. Aminoacid derivative	()
b. Epinephrine	ii. Steroid	()
c. Progesterone	iii. Protein	()
d. Growth hormone	iv. Peptide	()

Short Answer Type Questions

1. What is the role-played by luteinizing hormones in males and females respectively?
2. What is the role of second messenger in hormone action?
3. On an educational trip to Uttaranchal, Ketki and her friends observe that many local people were having swollen necks. Please help Ketki and her friends to find out the solutions to the following questions.
 - a. Which probable disease are these people suffering from?
 - b. How is it caused?
 - c. What effect does this condition have on pregnancy?
4. George comes on a vacation to India from US. The long journey disturbs his biological system and he suffers from jet lag. What is the cause of his discomfort?
5. Inflammatory responses can be controlled by a certain steroid. Name the steroid, its source and also its other important functions.
6. Old people have weak immune system. What could be the reason?
7. What are the effects of hypothyroidism (observed during pregnancy) on the development and maturation of a growing baby?
8. Mention the difference between hypothyroidism and hyperthyroidism.
9. You have learnt that a characteristic feature of endocrine system is the presence of feed back loops. By this what is meant if hormone A stimulates gland 'X' to secrete hormone B, the production of 'A' could be modified when the level of B changes in our blood. An example is the relation between hormones LH and estrogen (E_2). An old woman exhibits the following features. High levels of LH in blood but low levels of E_2 in the blood. Another woman exhibits high level of LH in blood and also high level of E_2 in the blood. Where is the defect in both these women? Provide suitable diagram to support this answer.

Long Answer Type Questions

1. A milkman is very upset one morning as his cow refuses to give any milk. The milkman's wife gets the calf from the shed. On fondling by the calf, the cow gave sufficient milk. Describe the role of endocrine gland and pathway associated with this response?
2. A sample of urine was diagnosed to contain high content of glucose and ketone bodies. Based on this observation, answer the following:
 - a. Which endocrine gland and hormone is related to this condition?
 - b. Name the cells on which this hormone acts.
 - c. What is the condition called and how can it be rectified?
3. Calcium plays a very important role in the formation of bones. Write on the role of endocrine glands and hormones responsible for maintaining Calcium homeostasis.
4. Illustrate the differences between the mechanism of action of a protein and a steroid hormone.
5. Hypothalamus is a super master endocrine gland. Elaborate.

XI CHEMISTRY INDEX

Chapters Name of the Chapter

1. Some basic concepts of Chemistry
2. Structure of Atom
3. Classification of Elements
4. Chemical Bonding and Molecular Structure
5. Hydrogen
6. S-Block Elements
7. Organic Chemistry : Some Basic Principles and Techniques
8. States of Matter
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10. Equilibrium
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12. p-Block Elements
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CLASS - XI

Unit 1 Some basic Concepts of Chemistry

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. Define law of multiple proportions with example.
2. Calculate the molecular mass of $C_{12}H_{22}O_{11}$
3. Calculate the no. of atoms present in 11.5 litres of H_2 at N.T.P.
4. Calculate the no. of moles of 5.68 gm. of iron.
5. What is the effect of temp. on molality and molarity?
6. An atom of an element is 10.1 times heavier than the mass of a carbon atom.
What is its mass in a.m.u.?
7. Explain with example, limiting reagent. $7 \times 1 = 7$
8. Differentiate between molarity and molality.
9. 1.82 g. of glucose (molar mass-180) is dissolved in 25g of water. Calculate (a) the molality (b) mole fraction of glucose and water.
10. The molecular mass of an organic compound is 90 and its %age composition is C-26.6%; O=71.1% and H=2.2%. Determine the molecular formula of the compound.
11. How chemical equations are made more informative?
12. How Avogadro's hypothesis used to deduce atomicity of elementary gases?

13. Verify law of Reciprocal proportions or law of equivalent proportions, with example.
14. Define formula mass and how does it differs from molecular mass? $7 \times 2 = 14$
15. Discuss Dalton's Atomic theory and its limitations?
16. Discuss Modern Atomic theory. Why it is better than Dalton's Atomic theory?
17. Commercially available sulphuric acid contains 91% acid by mass and has a density of 1.83 g mL^{-1} (i) Calculate the molarity of the solution (ii) volume of concentrated acid required to prepare 3.5L of 0.50 M H_2SO_4

Some More Questions :

18. A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% of chlorine. Its molar mass is 98.96g. What are its empirical and molecular formulas?
19. How much copper can be obtained from 110gm of CuSO_4 ?
20. What is Gay Lussac's law? Explain with two examples.
21. What are empirical and molecular formulae? How are they related to each other?
22. Differentiate between normality and molarity?
23. Why molality is preferred over molarity in expressing the concentration of a solution?
24. Explain with the help of an example law of conservation of mass and energy and also the law of constant proportions.
- 3
25. Discuss Avogadro's hypothesis.

Unit 2 Structure of Atom

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. From the following nuclei select the isotopes and isobars.

U, Th, U, Pa, Np 238

93

234

91

234

92

234

90

238

92

2. What is Zeeman effect and Stark effect?

3. Write electronic configurations, of Cr, Cu, Zn?

4. Define Aufbau's Principle. Which of the following orbitals are possible.

1 s, 1 p, 2 s, 3 d, 3 f

5. Explain Hund's rule of maximum multiplicity by taking an example of phosphorous.

6. Why are Bohr's orbits called Stationary States?

7. What is the difference between atomic mass and mass number?

8. Explain why the uncertainty principle is significant only for the microscopic particles

and not for the macroscopic particles?

9. Why half-filled and fully filled orbitals are extra stable?

10. Why config of 'Cr' is $3d^5 4s^1$ and not $3d^4 4s^2$ and 'Cu' is $3d^{10} 4s^1$ and not $3d^9 4s^2$?

11. Give differences between orbit and orbital.

12. What is photoelectric effect? What is the effect of frequency and intensity on photoelectric effect?

13. Why large no. of lines appear in the spectrum of hydrogen although it contains only one electron?

14. Derive de Broglie relationship and give its significance.

15. Give important postulates of Bohr's model of an atom.

16. Discuss Planck's Quantum theory of Radiation.

17. Using the s, p, d, f, notations describe the following quantum no.

(a) $n=1, l=0$ (c) $n=4, l=3$ (d) $n=4, l=2$

(b) $n=3, l=2$ (d) $n=5; l=4$ (e) $n=6; l=4$

Some more questions.

18. Discuss important facts about photoelectric effect.

19. Discuss black body radiation. Also explain its reason.

20. What are emission and absorption spectra? Why dark lines appear in the absorption spectra?

4

21. What is the frequency and wavelength of a photon emitted during a transition from $n=5$ state to $n=2$ state in the hydrogen atom.

22. Discuss drawbacks of Rutherford's Model.

23. Explain Heisenberg's uncertainty Principle.

24. What do you understand by an atomic orbital? Briefly describe the shapes of s , p & 'd' orbitals?

25. State and explain Aufbau's principle, Pauli's exclusion principle.

26. Explain the properties of cathode rays.

27. How are anode rays produced?

28. Write down the quantum numbers 'n', 'l' and 'm' for the following orbitals.

(i) $2\ 2\ 3$

xy

d

—

(ii) $2\ 4\ z\ d$ (iii) $xy\ 3d$ (iv) $xz\ 4d$ (v) $z\ 2\ p$

(vi) $x\ 3p$ (vii) $5\ f$ (viii) $y\ 2\ p$ (ix) $4s$

29. Which of the following sets of quantum numbers are not possible?

(i)

2

1

$n = 3, l = 2, m = 0, s = -$

(ii)

2

1

$$n = 3, l = 2, m = -2, s = -$$

(iii)

2

1

$$n = 3, l = 3, m = -3, s = +$$

(iv)

2

1

$$n = 3, l = 1, m = 0, s = +$$

30. Which of the following orbitals are not possible?

1p, 2s, 2p, 3f, 3d, 4f, 4d

5

Unit 3 Classification of Elements

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. What are magic numbers?
2. Give Modern periodic law.
3. What are Dobereiner's triads?
4. Give general electronic configuration of 'd'-block and 'f'-block elements.
5. What are the defects of long form of the periodic table?
6. What is the cause of periodicity?
7. What are successive ionization enthalpies?
8. Why ionization enthalpy of 'Be' is more than 'B' and of 'N' is more than 'O' explain?
9. Why electron gain enthalpies of Noble gases are positive while those of 'Mg' and 'P' are almost zero?
10. Why electron gain enthalpy of fluorine is less negative than that of chlorine?
11. What are iso electronic species? How are their sizes vary in iso electronic series?
12. Which of the following will have the largest and smallest size and why?

C/, C/-1, A/, Aβ+

13. Why d- and f-block elements are less electropositive than group 1 and 2 elements?

14. What is diagonal relationship? Explain it with the help of 'Be' and 'Al'.

15. What is ionisation enthalpy? On what factors it depends?

16. What is electron gain enthalpy? On what factors it depends. How it varies in a group and in a period?

17. How will you justify presence of 18 elements in 5th period and presence of 32 elements in 6th period?

Unit 4 Chemical Bonding and Molecular Structure

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. Why do atoms combine?

2. What is the significance of Lewis Symbols?

3. Give structure of BrF₅

4. Why H₂O is liquid and H₂S is a gas?

5. Why NH₃ is liquid and PH₃ is a gas?

6. Boiling point of p-nitrophenol is more than O-nitrophenol why?

7. How is paramagnetic character of a compound is related to the no. of unpaired electrons?

6

8. Describe a co-ordinate bond with an example. How does it differs from a covalent bond?

9. How is MgF₂ and Al₂O₃ formed?

10. What is an Octet rule? What are its limitations?

11. Which out of NH₃ and NF₃ has higher dipole moment and why?

12. Draw molecular orbital diagram for N₂

+ molecule.

13. HCl is a covalent compound but it ionises in the solution?

14. The molecule of CO₂ is linear whereas that of SnCl₂ is angular why?

15. Give molecular orbital energy level diagram of CO. Write its electronic configuration, magnetic behaviour and bond order.
16. How is ionic bond formed? On what factors it depends?
17. Calculate the lattice enthalpy of KCl from the following data by Born-Haber's Cycle.

Enthalpy of sublimation of K = 89 KJ mol⁻¹

Enthalpy of dissociation of Cl₂ = 244 KJ mol⁻¹

Ionization enthalpy of potassium = 425 KJ mol⁻¹

Electron gain enthalpy of chlorine = - 355 KJ mol⁻¹

Enthalpy of formation of KCl = -438 KJ mol⁻¹

More questions

18. How do atoms combine? Describe briefly.
19. Give characteristics of ionic compounds.
20. How is covalent bond formed discuss with the help of N₂, CH₄, C₂H₂?
21. Give postulates of VSEPR theory.
22. Discuss types of covalent bonds with the help of example. Why pi-bond can't exist independently?
23. Discuss the factors affecting bond enthalpy
24. Discuss the partial ionic character of covalent bond by taking an example.
25. Give applications of dipole moment.
26. Discuss partial covalent character of ionic bonds.
27. What is hybridisation? Discuss facts about hybridisation.
28. Give salient features of Molecular orbital theory.
29. Differentiate between bonding and anti bonding molecular orbitals.
30. Discuss the conditions for the combination of atomic orbitals to form molecular orbitals.
31. What are the consequences of hydrogen bonding?
32. Discuss types and conditions for hydrogen bonding.
33. Why density of water is maximum at 277K? Discuss.

34. Why KHF_2 exists while KCl_2 does not?

35. Which is more polar and why, CO_2 or N_2O ?

7

Unit 5 Hydrogen

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. What are nuclear spin isomers of Hydrogen?

2. Why is dihydrogen not preferred in balloons?

3. Phosphorus forms only PH_3 and not PH_5 why?

4. How is temporary hardness of water removed?

5. Write the names of isotopes of hydrogen. What is the mass ratio of these isotopes?

6. What are electron deficient and electron rich compounds of hydrogen? Give examples.

7. Is distilled water useful for drinking purpose? If not, how can it be made useful?

8. What is autoprotolysis of water? What is its significance?

9. How does H_2O_2 behave as a bleaching agent?

10. What properties of water make it useful as a solvent? What types of compound can it dissolve and hydrolyse?

11. What do you understand by terms hydrolysis and hydration? Give examples.

12. What do you understand by term hydrogen economy?

13. H_2O_2 act both as oxidising and reducing agent, Justify it with the help of examples.

14. (i) How does H_2O_2 reacts with KMnO_4 in alkaline medium?

(ii) How does H_2O_2 reacts with $\text{K}_2\text{Cr}_2\text{O}_7$ in acidic medium?

15. Give uses of heavy water. Can heavy water be used for drinking?

16. (i) How water act both as an oxidising and reducing agent? Give examples.

(ii) What is coal gasification?

17. How does hydrogen resembles halogens and alkali metals and how it differs from them.

Unit 6 S-Block Elements Alkali Metals

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. What is the cause of diagonal relationship?
2. Alkali metals have the lowest ionisation enthalpy in each period. Why?
3. The second ionisation enthalpies of alkali metals are very high?
4. All the alkali metals impart characteristic colour to flame. Why?
5. Alkali metals show photoelectric effect. Why?
6. Cesium show photoelectric effect to the maximum extent. Why?
7. Why alkali metals are soft and have low m.pt and b.pt.?
8. Alkali metals are very reactive. Justify with the help of examples.
9. Alkali metals are kept in kerosene oil why?
10. When alkali metals dissolves in liquid ammonia, the solution can acquire different colours. Explain the reason.

8

11. Why lithium shows anomalous behaviour?
12. Why lithium is the strongest reducing agent where as its ionization enthalpy is highest?
13. What is polarisation discuss it by taking example of lithium?
14. The hydroxides of alkali metals are strongly basic why?
15. How is sodium carbonate prepared by Solvay process?
16. How is sodium hydroxide prepared by Castner Kellner cell?
17. (i) Can we store sodium in water or not? Why.
(ii) Write balanced equations for the following
(a) Na_2O_2 and H_2O (b) KO_2 and H_2O
18. LiH is more stable than NaH . Explain.

Unit 6 S-Block Elements Alkali Earth Metals

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. Although IE_1 values of alkaline earth metals are higher than those of alkali metals, the

IE2 values of alkaline earth metals are much smaller than those of alkali metals why?

2. Calcium and strontium give characteristic colour to the flame but beryllium and

magnesium do not give any characteristic flame colours. Why?

3. Hydration enthalpies of alkaline earth metals are larger than those of the corresponding alkali metals. Why?

4. Why beryllium and magnesium form complexes?

5. The hydroxides of alkaline earth metals are less basic than alkali metals of the corresponding periods. Why?

6. What is cement? What is its composition?

7. What is dead burnt plaster? How is it obtained?

8. (i) BeCl_2 can be easily hydrolysed why?

(ii) What is the difference between quick lime, Slaked lime and lime water?

9. (i) Why are halides of beryllium polymeric?

(ii) Explain why can alkali and alkaline earth metals not be obtained by chemical reduction methods?

10. What happens when

(i) 'Mg' is burnt in air. (ii) Quick lime is heated with silica

(iii) Chlorine reacts with Slaked lime. (iv) Calcium nitrate is heated.

11. Why does the solubility of alkaline earth metal carbonates and sulphates decrease

down the group?

12. Why does solubility of alkaline earth metal hydroxides increase down the group?

13. (i) What is hydrolith?

(ii) Which out of Mg^{2+} , Ba^{2+} , Ca^{2+} has maximum ionic mobility in water and why?

9

14. How does quick lime reacts with water, carbon dioxide and phosphorous pentoxide.

15. How is lime stone manufactured and how it reacts with HCl and H_2SO_4 ?

16. Discuss chemical properties of Slaked lime.
17. How beryllium behaves differently as compare to magnesium or compare physical and chemical properties of beryllium and calcium.

Unit 7 Organic Chemistry : Some basic Principles and Techniques

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. What is catenation?
2. What are homocyclic and heterocyclic compounds? Give examples.
3. What is a homologous series?
4. Define structural isomerism. Give structural isomers of butane.
5. Explain metamerism with example.
6. What is tautomerism? Give example.
7. Give all possible isomers of Hexane.
8. What is positive and negative inductive effect? Give examples.
9. What is electromeric effect? Discuss it with the help of an example.
10. Give resonating structures of $C_6H_5NH_2$ molecule.
11. What is homolytic and heterolytic fission?
12. What are free radicals? Which is the most stable free radical and why?
13. What is carbocation? Why tertiary carbocation is most stable?
14. What is carbanion? Which is the most reactive carbanion and why?
15. What are electrophiles and nucleophiles and what are their types? Discuss in detail.
16. What is resonance effect? Discuss positive and negative (+R; -R) effect with example.
17. What is hyperconjugation? Give applications of hyperconjugation.

Or

Discuss Addition reaction and Elimination reaction in detail.

Or

Give IUPAC Name of the following:

- (i)
- (ii)
- (iii)

Unit 8 States of Matter

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. How is the pressure of a gas related to its density at a particular temperature?
2. A gas occupies 180 mL at a pressure of 0.740 bar at 20°C. How much volume will it occupy when it is subjected to external pressure of 1.025 bar at the same temp.?
3. A sample of gas occupies 2.50 L at 25°C. If the temp is raised to 65°C, what is the new volume of the gas if pressure remains constant?
4. Give physical significance of Gay Lussac's Law in daily life.
5. How is gas constant 'R' related to work?
6. Why drop of a liquid is spherical in shape?
7. What is laminar flow?
8. Derive Ideal gas equation.
9. CO₂ is heavier than N₂ and O₂ gases present in the air but it does not form the lower layer of the atmosphere. Explain?
10. What is an ideal gas? Why do real gases deviate from ideal behaviour?
11. Will water boil at higher temp at Sea level or at the top of mountains and why?
12. Why does the temp. of the boiling liquid remains constant even though heating is continued?
13. Calculate the temp. of 5.5 moles of a gas occupying 6 dm³ at 3.35 bar (R=0.083 bar dm³ k⁻¹ mol⁻¹)
14. The drain cleaner contains small bits of aluminium, which react with caustic soda to produce H₂ gas. What volume of H₂ gas at 20°C and one bar pressure will be released when 0.15 gm of 'Al' reacts?

15. Give various postulates of kinetic molecular theory of gases and also give its justification.

16. What is liquefaction of a gas? Discuss Andrew's isotherms for CO_2 and important conclusions.

17. According to kinetic theory, the forces of attraction between the gas molecules are negligible. Discuss it.

More questions :

18. Why mercury is used as a liquid in a barometer? Explain.

19. A one litre flask contains helium gas and 1.5 litre flask contains xenon gas at the same temp and pressure. What is the ratio of number of atoms in the two flasks?

20. How will you determine pressure of a dry gas by using Dalton's law of partial pressures?

21. Differentiate between diffusion and effusion. What is the cause of diffusion?

22. Two gases A & B having same volume diffuse through a porous partition in 30 secs.

and 20 secs. respectively. The molecular mass of A is 45. Find the molecular mass of B.

11

23. Calculate the volume of oxygen that will diffuse in the same time as 50 ml of SO_2 .

24. Discuss the factors on which vapour pressure depends.

25. What is the effect of temp. and pressure on surface tension and viscosity?

26. Discuss dipole – induced dipole forces with example.

27. Give characteristics of London forces.

28. Why CO_2 and NH_3 can be liquefied easily whereas H_2 , O_2 and N_2 cannot be liquefied.

29. Which out of the following will have higher vapour pressure at a given temp. and

why? (a) Polar liquids like water (b) Non-Polar liquids like ether.

30. Why do gases deviate from ideal behaviour?

31. Compare the properties of solids, liquids and gases.

32. Why do ionic compds have higher m.pt. ?

Unit 9 Thermodynamics

One mark questions.

1. What is meant by extensive and intensive properties?

2. What is meant by State function and path function?

3. What is a perpetual motion machine? Is it possible?

4. Express the change in internal energy of a system when 'W' amount of work is done

by the system and 'q' amount of heat is supplied to the system. What type of system

would it be?

5. A system absorbs energy equivalent to 415 J and performs work equivalent to 205.15J. Calculate the change in internal energy of the system.

6. Why it is necessary to define the standard state?

7. Why does a real crystal has more entropy than an ideal crystal?

Two mark questions.

8. Is decrease in enthalpy the only criterion for spontaneity? Justify with example.

9. Is tendency towards maximum randomness the sole criterion for spontaneity? Justify

with example.

10. Justify Hess's law of constant heat Summation with suitable example.

11. Absolute value of internal energy cannot be determined. Explain?

12. Ethanoic acid and hydrochloric acid react with sodium hydroxide solution.

The

enthalpy of neutralisation of ethanoic acid is $-55.8 \text{ KJ mol}^{-1}$ while that of hydrochloric

acid is $-57.3 \text{ KJ mol}^{-1}$. Can you think of the difference?

13. Predict the enthalpy change, free energy change and entropy change when ammonium chloride is dissolved in water and the solution becomes colder.

14. Discuss the effect of temperature on the spontaneity of an exothermic and endothermic reaction.

12

Three marks questions.

15. (i) Absolute value of internal energy cannot be determined. Explain.

(ii) When ΔG is positive, the process is always non spontaneous. Explain.

16. (i) Explain the meaning of driving force of a chemical reaction. How is ΔG related to ΔH and ΔS in a reaction?

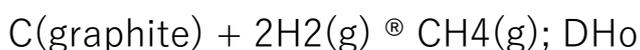
(ii) How does ΔS determine the spontaneity of a process?

17. (i) How will you justify that both 'q' and 'w' are not state functions, yet (q+w) is a state function?

(ii) ΔH is negative for exothermic reaction and positive for endothermic reaction. Explain.

18. For a reaction both ΔH and ΔS are positive. Under what conditions will the reaction be spontaneous?

19. Determine ΔH°_r at 298 K for the reaction.



r = ?

you are given



r = - 393.5 KJ mol⁻¹



r

= +890.3 KJ mol⁻¹

20. Predict the feasibility of a reaction when both ΔH and ΔS are negative.

21. For the reaction $A(g) + 3B(g) \rightleftharpoons 2C(g)$, the enthalpy change is $-90.2 \text{ KJ mol}^{-1}$ and ΔS is -

$0.1584 \text{ KJ K}^{-1} \text{ mol}^{-1}$. Predict whether the reaction is feasible or not at 298 K ?

22. Enthalpy and entropy changes of a reaction are $49.57 \text{ KJ mol}^{-1}$ and $123.2 \text{ J K}^{-1} \text{ mol}^{-1}$.

Calculate the free energy change of the reaction at 27°C .

24. Give reason why heat of neutralization less than 57.1 KJ mol^{-1} when 0.1 N Solution of

acetic acid is neutralized by 0.1 N NaOH solution?

Unit 10 Equilibrium

Total = 30 Marks

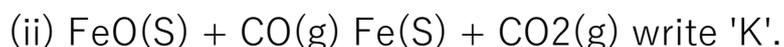
One mark questions :

1. What do you mean by homogenous and heterogenous equilibria?

2. Write the expression for the equilibrium constant 'K' for each of the following reaction.



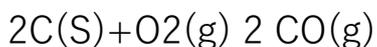
3. (i) $\text{I}_2(s) + 5\text{F}_2(g) \rightleftharpoons 2\text{IF}_5$ write 'K'



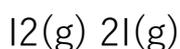
4. What is the effect of reducing the volume on the system in equilibrium represented

below :

13



5. What is the effect of increase of temperature on equilibrium constant for the following reaction.



6. The equilibrium constant expression for a gaseous reaction is

$\frac{[\text{C}]^c}{[\text{A}]^a [\text{B}]^b}$

$\frac{[\text{C}]^c}{[\text{A}]^a [\text{B}]^b}$

2

4

5

2

4

3

$NOHO$

NHO

$K_c =$

write the balanced chemical equation corresponding to this expression.

7. What are conjugate acid-base pairs? Give an example.

Two marks questions.

8. Give limitations of Arrhenius concept of Acids and bases.

9. Give advantages of Bronsted-Lowry concept over Arrhenius concept.

10. (i) What will be the conjugate bases for the following Bronsted acids?

HF, H₂SO₄, HCO₃, H₃PO₄

(ii) What will be the conjugate acids for the following Bronsted bases?

—

2 NH₂, NH₃, HCOO⁻, ClO₄

-

11. Why PO₄³⁻

ion is not amphiprotic?

12. What is a buffer solution? Ammonium acetate is a buffer where as sodium chloride is

not. Why?

13. What are acidic buffers? Explain with the help of an example.

14. What are basic buffers? Explain with the help of an example.

Three marks questions.

15. (i) Derive an expression for the calculation of the degree of ionization of a weak

electrolyte.

(ii) Why is ammonia termed as lewis base? Illustrate with two examples.

16. (i) Addition of a drop of HCl to an acidic buffer of acetic acid and sodium acetate

does not produce any appreciable change in the pH of the solution. Why?

(ii) A chemical equilibrium is dynamic in nature. Explain.

17. What do you mean by strength of an acid? How can the strength of the two acids be

compared?

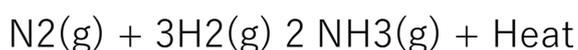
More questions.

18. What are the important characteristics of chemical equilibrium?

19. What is the difference between amphoteric and amphiprotic?

20. Using Le-chatelier's principle, predict the effect of (a) decreasing the temperature (b)

increasing the pressure on the following system.



21. The dissociation constant of NH_4OH at 298 K is 1.8×10^{-5} . Calculate the degree of

dissociation of 0.01 M Sol. of NH_4Cl . K_w at 298 K = 10^{-14}

14

22. Calculate the hydrolysis constant of the salt containing –

2 NO ions. K_a for HNO_2

= 4.5×10^{-10}

23. Determine the degree of hydrolysis at 0.10 M solution of sodium acetate at 298 K. (K_a

for $\text{CH}_3\text{COOH} = 1.8 \times 10^{-5}$ & $K_w = 1 \times 10^{-14}$). Also calculate hydrolysis constant and

pH.

24. The aqueous sol. of all Salts of weak acids and strong bases are alkaline. Justify it

with the help of an example.

25. The aqueous sol. of all Salts of weak bases and strong acids are acidic.

Justify it with

the help of an example.

26. All Arrhenius acids are Bronsted-Lowry acids but all Arrhenius bases are not Bronsted-Lowry bases. Justify this statement with example.

Unit 11 Redox Reactions

Total = 30 Marks

One mark questions :

1. Calculate the oxidation number of Mn in KMnO_4 and 'Cr' in $\text{K}_2\text{Cr}_2\text{O}_7$.
2. Identify the oxidant and reductant in the following reactions.
 - (i) $2\text{Zn}(\text{s}) + \text{O}_2(\text{g}) \rightarrow 2\text{ZnO}(\text{s})$
 - (ii) $\text{I}_2(\text{g}) + \text{H}_2\text{S}(\text{g}) \rightarrow 2\text{HI}(\text{g}) + \text{S}(\text{s})$
3. Which elements always have positive oxidation state?
4. What is the function of salt bridge?
5. Give applications of electrochemical series.
6. What are direct and indirect redox reactions?
7. Oxidation and reduction go side by side in a redox reaction. Justify it.

Two marks questions:

8. (i) Why are redox reactions called electron transfer reaction?
(ii) Can the same element have different oxidation numbers in different compounds? Justify.
9. (i) What happens when a zinc rod is dipped in a copper sulphate solution?
(ii) What are combination redox reactions and decomposition redox reactions? Give examples.
10. H_2S acts as a reducing agent while SO_2 acts as an oxidising as well as reducing agent. Explain.
11. Give important features of Half-cell reactions.
12. HNO_3 acts as an oxidising agent while HNO_2 can act both as a reducing agent as well as oxidising agent explain.
13. Give differences between oxidation no. and valency.
- 15.
14. Are all decomposition reactions redox reactions? Comment.

Three marks questions :

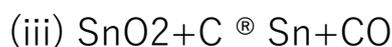
15. What do you understand by metal displacement redox reactions? How these differ

from non-metal displacement reactions?

16. (i) What would happen if no salt bridge is used in ZnSO₄ – CuSO₄ electrochemical cell?

(ii) What happens when copper rod is dipped in AgNO₃ Solution?

17. Mention oxidation, reduction, oxidising agent and reducing agent in the following reactions.

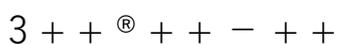


More questions :

18. Balance following equations by oxidation no. method.



2

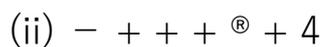
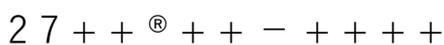


2

19. Balance following equations by Ion-Electron method.



2 2 3 3



2



20. Give differences between Electrochemical cell and Electrolytic cell.

21. What are disproportionation redox reaction? Give example.

22. Give limitations of concept of oxidation number.

23. Give advantage of electron density concept over oxidation no. concept.

24. Discuss the role of redox titrations in volumetric titrations.
25. Chlorine, bromine and iodine disproportionate in alkaline medium but fluorine does not. Why?
26. Give an important application of non-metal displacement redox reactions in qualitative mixture analysis.
27. Assign oxidation no. of the followings :
 - (i) 'P' in Na_2HPO_4 (ii) 'S' in NaHSO_4
 - (iii) 'P' in H_3PO_4 (iv) 'S' in $\text{K}_2\text{S}_2\text{O}_8$
 - (v) 'Pt' in K_2PtCl_6 –
 - (vi) 'Cl' in KClO_4

16

Unit 12 *p*-Block Elements Boron. Family

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. Why atomic radii of 'Ga' is smaller than 'Al'?
2. BCl_3 is known but TlCl_3 is not known. Why?
3. The metallic character increases from boron to aluminium and then decreases from aluminium to thallium. Explain.
4. Boron is a non-metal where as 'Al' is a metal. Why?
5. What is inert pair effect?
6. The reducing character of elements of gr. 13 goes on decreasing down the group. Why?
7. BCl_3 acts as a lewis acid. How?
8. Discuss structure of diborane.
9. Why BCl_3 is a stronger lewis acid than BF_3 ?
10. BCl_3 exists as a monomer where as AlCl_3 exists as a dimer why?
11. Borazine is more reactive than benzene. Why?
12. Why alumina cannot be reduced by Carbon?
13. Why anhydrous aluminium chloride has a lower melting point than anhydrous aluminium fluoride?

14. Why boron and thallium does not form B^{3+} and Tl^{3+} ions?
15. (i) Why ionisation enthalpy of 'Ga' is higher than that of 'Al'?
- (ii) Thallous compounds (Tl^+) are more stable than thallic (Tl^{3+}) compounds. Why?
16. Boron and Silicon are diagonally related to each other. Give chemical reactions to prove this.
17. (i) What is thermite welding?
- (ii) Why B-F bond length in BF_3 is Smaller than the expected value?
- (iii) BF_3 is not hydrolysed where as BCl_3 get easily hydrolysed. Explain.

Unit 12 *p*-Block Elements The Carbon-Family

One mark questions:

1. Tin and lead show '+2' and '+4' oxidation states but for lead compounds +2 oxidation state is more stable. Why?
2. $[SiF_6]^{2-}$ is possible where as $[CF_6]^{2-}$ is not possible. Why?
3. Which allotropes of Carbon acts as an abrasive and which as a lubricant?
4. Why is diamond denser than graphite?
5. What are Silicones?
6. Diamond is covalent, yet it has high melting point. Why?
7. $[]^{2-}$
 $6 SiF$ is known but $[]^{2-}$
 $6 SiCl$ is not. Give reason.
- 17

Two mark questions.

8. Why does carbon not form either C^{4+} or C^{4-} ions?
9. Give the differences in structures of the following pair of compounds: CO_2 and SiO_2 .
10. Why $(CH_3)_3N$ is Pyramidal but $(CH_3)_3N-S-H$ is planar?
11. Why elemental Silicon does not form a graphite like structure, as carbon does?

12. Give Chemical reaction to show that Tin (II) is a reducing agent, whereas, lead (II) is not.

13. Why milkiness disappears when excess of CO₂ gas is passed through lime water?

14. The ionization enthalpy of lead is more than tin. Why?

Three marks questions.

15. (i) Why CO₂ has no net dipole moment? 1½

(ii) Carbon forms covalent compounds whereas lead forms ionic compounds. Why? 1½

16. (i) Why BCl₃ and CCl₄ behave differently towards water?

(ii) What are Silicates?

17. Write a short note on fullerenes.

Unit 13 Hydrocarbons Alkanes & Alkenes

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. What are Saturated and unsaturated hydrocarbons?

2. How are alkanes prepared by Grignard's reagent?

3. Give mechanism of Wurtz reaction.

4. How will you convert acetaldehyde to ethane and acetone to propane?

5. Boiling points of isomeric alkanes goes on decreasing with increased branching.

Why?

6. Alkanes with even no. of carbon atoms have high melting point as compare to alkanes

with odd no. of carbon atoms why?

7. Give mechanism of sulphonation of alkanes?

8. *n*-pentane has higher boiling point than neo pentane. Explain.

9. Mention primary, secondary and tertiary carbons and hydrogens in the following

compound.

10. Eclipsed conformation is less stable than staggered conformation of ethane. Explain.
11. What is geometrical isomerism and what is its cause?
12. What are the necessary conditions for the geometrical isomerisation?
13. How are alkenes prepared by Kolbe's Electrolytic process?
14. Why alkenes undergo electrophilic addition and not electrophilic substitution reaction?
15. (i) Explain and Justify Markownikoff's rule.
(ii) Give mechanism of Kharash effect.
16. (i) Give ozonolysis reaction of ethene.
(ii) How is structure of alkene elucidated by ozonolysis ?
17. (i) What is lindlar's catalyst? What is its use?
(ii) Cis alkenes show higher boiling point as compared to trans-isomer. Why?

Unit 13 Hydrocarbons Alkenes and Alkynes

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. How will you prepare acetylene from calcium carbide?
2. Discuss Kolbe's electrolytic method to prepare acetylene.
3. Convert Chloroform into acetylene.
4. Convert methane into acetylene.
5. Alkynes do not exhibit geometrical isomerism while alkenes do so why?
6. Alkynes are less reactive than alkenes towards electrophilic addition reaction why?
7. Convert acetylene into ethanol.
8. Why does acetylene behave like a weak acid?
9. Write two reactions to show acidic nature of acetylene.
10. What is peroxide effect? Why is it applicable only in case of addition of HBr and not in case of HCl and HI?
11. Alkynes undergo both electrophilic and nucleophilic addition reactions. Why?
12. Discuss structure of alkyne.
13. Alkynes are acidic in nature. Explain.
14. Give reaction for the detection of terminal alkynes.

15. (i) Give mechanism of addition of halogens to alkynes.
(ii) Why alkynes undergo nucleophilic addition reactions while simple alkenes do not?
16. (i) How will you convert acetylene into oxalic acid?
(ii) How will you convert propyne into ethanoic acid?
(iii) How will you convert acetylene into acrylic acid?
17. (i) How will you distinguish between Ethane and Ethyne? Give reaction.
(ii) How will you distinguish between Ethene and Ethyne? Give reaction.
- 19
(iii) How will you distinguish between propane and cyclopropane ? Give reaction.

Unit 13 Hydrocarbons Benzene

Q.No.1-7 : 1 Mark, 8-14 = 2 Marks, and 15-17 = 3 Marks Total = 30 Marks

1. What are aromatic hydrocarbons?
2. Give IUPAC names of the following compounds.
 - (i)
 - (ii)
3.
 - (i)
 - (ii)
4. What is aromaticity?
5. How will you convert n-hexane to benzene?
6. How will you convert benzene to benzoic acid?
7. How will you convert benzene to benzaldehyde?
8. What are activating groups? Explain it with example.
9. Give mechanism of nitration of chlorobenzene.
10. What are electron withdrawing groups? Why are they meta-directing?
11. Give mechanism of chlorination of Nitrobenzene.
12. Give mechanism of Friedal-craft acylation reaction.
13. (i) How will you convert benzene to benzophenone?
(ii) How will you convert benzene to acetophenone?
14. Give mechanism of Sulphonation of benzene.
15. (i) Give mechanism of nitration of benzene.

- (ii) How will you prepare benzene from diene's?
16. How is structure of benzene deduced? Discuss in detail.
17. Discuss evidences in favour of resonating structure of benzene.
18. Why does benzene undergo electrophilic substitutions reactions easily and nucleophilic substitutions with difficulty?
19. How would you convert following compounds into benzene?
(i) Ethyne (ii) Ethene (iii) Hexane
- 20.
20. Arrange benzene, n-hexane and ethyne in decreasing order of acidic behaviour. Also give reasons.
21. Out of benzene, m-dinitrobenzene and toluene which will undergo nitration most easily and why?
22. Although benzene is highly unsaturated yet it does not prefer to undergo addition reactions. Explain.
23. Why is benzene extra ordinarily stable though it contains three double bonds?
24. What are the necessary conditions for any system to be aromatic?

Unit 14 Environmental Chemistry

Total 30 marks

One mark questions

1. List gases which are responsible for green house effect.
2. What is Smog?
3. How is classical smog different from Photochemical Smog?
4. Give one advantage and one disadvantage of ozone in the atmosphere.
5. What is meant by term 'Sink' and target with respect to pollution?
6. How plant nutrients and pesticides act as water pollutants?
7. What are polynuclear aromatic hydrocarbons (PAH)?

Two mark questions.

8. What are the harmful effects of PAH?

9. How NO_x pollution can be controlled? Explain.
10. (i) How lead halides enter into atmosphere as pollutants?
(ii) How do contaminants differ from pollutants?
11. What are the primary and secondary pollutants of the air?
12. What is chemical oxygen demand? Explain.
13. What is biochemical oxygen demand? Explain.
14. What is meant by inversion temperature in different regions of the atmosphere?

Three mark questions.

15. Chlorine radical plays an important role in the destruction of ozone. Explain.
16. CO₂ is inert and harmless gas, yet it is thought to be a serious pollutant. Explain.
17. What are the reactions involved for ozone layer depletion in the stratosphere?

21

Some more questions.

18. Write down the reactions involved during the formation of Photochemical Smog.
19. Explain tropospheric pollution.
20. What are the harmful effects of photochemical Smog and how can they be controlled?
21. What do you mean by green chemistry? How will it help in decreasing environmental pollution?
22. How can domestic waste be used as manure?
23. What is acid rain? Give some of its harmful effects?
24. What is incineration? Explain.
25. Name and explain any four methods of waste management.

Consumer's equilibrium, demand and elasticity of demand

16 marks

2003 - 04

Q1- What is meant by price elasticity of demand?(1)

Q2- Mention any three factors that affect the price elasticity of demand of a commodity. (3)

Q3- Distinguish between change in demand and change in quantity demanded of a commodity.(3)

Q4- Explain with the help of diagrams the effect of the following changes on the demand of a commodity (6)

(i) A fall in the price of complementary good.

(ii) A rise in the income of its buyer.

2004 - 05

Q5- Define demand by a consumer. (1)

Q6- Explain the law of demand with the help of a demand schedule. (3)

Q7- The price elasticity of demand for a good is (-) 2. 80 units of this good are bought at a price of Rs. 5 per unit. Calculate the price at which 112 units of it will be bought. (3)

Q8- The price elasticity of demand for a good is (-) 1. 72 units of this good are bought at a price of Rs4 per unit. At what price will 90 units be bought? Calculate. (3)

Q9- State six determinants of market demand. (3)

Q10- Briefly explain any three factors that shift the demand curve to the right. (3)

Q11- When the price of a commodity falls from Rs.20 per unit to Rs. 16 per unit, its quantity demanded rises from 1000 units to 1160 units. Calculate its price elasticity of demand. Is its demand inelastic? Give reasons for your answer. (4)

Q12- At a price of Rs.50 per unit, the quantity demanded of a commodity is 1000 units. When its falls by 10 percent, its quantity demanded rises to 1080 units. Calculate its price elasticity of demand. Is its demand inelastic? Give reasons for your answer. (4)

Q13- The price of a commodity is Rs.50 per unit and its quantity demanded is 500 units. Its price rises to Rs.60 per unit and quantity demanded falls by 90 units. Calculate its price elasticity of demand. Is its demand elastic? Give reasons for your answer.(4)

Q14- Differentiate between: (6)

(i) Normal good and inferior good, and

(ii) Complementary good and substitute good.

2005 - 06

Q15- Explain the effect of the following on the demand of a good (6)

(i) Change in the income of the consumer.

(ii) Change in the prices of the related goods.

Q16- Define price elasticity of demand. State any four factors that affect it. (6)

2006 -07

Q17- When a good is called a normal good.(1)

Q18- State any three factors that affect the price elasticity of demand of a commodity. (3)

Q19- Define market demand. State the factors that affect it.(6)

2007 -08

Q20 - What is a demand schedule? (1)

Q21- Price elasticity of demand of a good is (-) 1. At a given price the consumer buys 60 units of the good. How many units will the consumer buy if the price falls by 10 percent? (3)

Q22- Price elasticity of demand of a good is (-) 3. If the price rises from Rs.10 per unit to Rs.12 per unit, what is the percentage change in demand? (3)

Q23- Price elasticity of demand for a good is (-) 2. The consumer buys a certain quantity of this good at a price of Rs.8 per unit. When the price falls he buys 50 percent more quantity. What is the new price? (3)

Q24- Given the market price of a good, how does a consumer decide as to how many units of that good to buy? Explain. (3)

Q25- Explain the effect of the following on demand for a good: (6)

- (i) Rise in income
- (ii) Rise in prices of related goods.

2008 - 09

Q26- What is meant by inferior good in economics? (1)

Q27-Distinguish between demand by an individual and market demand with the help of a schedule. (3)

Q28- State the law of demand and show it with the help of a schedule. (3)

Q29- Explain the geometric method of measuring price elasticity of demand. (3)

Q30-Explain any two factors that affect the price elasticity of demand of a commodity.(3)

Q31- Explain the effect of the following on the market demand of a commodity - (6)

- (a) Change in price of related goods.
- (b) Change in the number of its buyers.

Q32- State the causes of an 'increase' in demand. Explain any two of them. (6)

Comp 2008 - 09

Q33- Define demand.

Q34- Explain the meaning of 'change in demand'. How does it affect the demand curve?

Q35- A 5% rise in price of a good leads to 20% fall in its demand. A consumer buys 80 units of the good at a price of Rs.10 per unit. How many units will the consumer buy when price changes to Rs.11? Calculate.(3)

Q36- Explain the effects of the following on demand for a good by a consumer:

- (i) Fall in the prices of related goods.
- (ii) Rise in the income of the consumer.

2009 - 10

Q37 - Define a budget line./ Indifference curve / Indifference map. (1)

Q38- What is meant by normal good in economics?(1) / inferior goods. / *Inelastic demand*

Q39- Explain any two causes of 'increase' in demand of a commodity.(3)

OR

Explain the inverse relationship between price and quantity demanded of a commodity.

Q40- Explain the effect of the following on the price elasticity of demand of a commodity.(3)

- (i) Number of substitutes
- (ii) Nature of the commodity

Q41- The price elasticity of demand of a commodity is (-)1.5. When its price falls by Rs.1 per unit its quantity demanded rises by 3 units. If the quantity demanded before the price change was 30 units, what was the price at this demand? Calculate.(4)

Q. When price of a commodity falls by Rs.1per unit, its quantity demanded rises by 3 units. Its price elasticity of demand is (-) 2. Calculate its quantity demanded if the price before the change was Rs.10 per unit.

Q. When price of a commodity falls by Rs.1per unit, its quantity demanded rises by 6 units. Its price elasticity of demand is (-) 1. Calculate its quantity demanded if the price before the change was Rs.20 per unit.

Comp 2009 - 10

Q41. Explain, by giving an example, how is demand for a good affected when the price of its substitute good rises.(3)

Q42. What is law of demand? Prepare a demand schedule based on the law of demand.(3)

Q43. Explain the effect of rise in income of a consumer on his demand for a good.(3)

Q44. Explain, by giving an example, how is demand for a good affected when the price of its complementary good rises.(3)

Q45. Calculate price elasticity of demand by comparing expenditures.(4)

Price	Demand
9	8
8	9

Q46. Calculate price elasticity of demand by comparing expenditures:

Price	Demand
10	0
9	10

Q47. Calculate price elasticity of demand by comparing expenditures:

Price	Demand
0	10
1	5

2010-11

Q Define budget line.(1)

Q48. When price of a good is Rs.13 per unit, the consumers buys 11 units of that good. When price rises to Rs.15 per unit, the consumer continues to buy 11 units. Calculate price elasticity of demand.(3)

Q49. When price of a good is Rs.12 per unit, the consumers buys 24 units of that good. When price rises to Rs.14 per unit, the consumer continues to buy 20 units. Calculate price elasticity of demand.(3)

Q50. From the following data calculate elasticity of demand.(3)

PRICE	Q.D
9	100
9	150

Q. A consumer consumes only two goods X and Y. At a consumption level of these two goods, he finds that the ratio of marginal utility to price in case of X is higher than in case of Y. Explain the reaction of the consumer.(4)

- Q. Explain the law of diminishing marginal utility with the help of a total utility schedule.(4)
- Q. Explain how rise in income of a consumer affects the demand of a good. Give examples. (4)
- Q. Explain the concepts of (i)marginal rate of substitution and (ii) budget line equation with the help of numerical examples.(6)
- Q51. Explain how rise in income of a consumer affects the demand of a good. Give example.(4)
- Q. Explain the conditions of consumer's equilibrium with the help of the Indifference Curve Analysis.(6)

Comp 2010-11

- Q52. What causes an upward movement along a demand curve? (1)
- Q53. Explain the effect of rise in income of the buyers of a commodity on its demand. (3)
- Q54. Explain the effect of the following on price elasticity of demand of a good.(4)
- (i) Number of substitutes of the good.
 - (ii) Proportion of income spent on the good.

OR

Give the meaning of price elasticity of demand. Explain the relationship between it and total expenditure.

- Q55. How is the demand of a commodity affected by a fall in the prices of related goods?

2011-12

- Q56. Give one reason for a shift in demand curve. (1)
- Q57. (a) A consumer buys 10 units of a commodity at a price of Rs.10 per unit. He incurs an expenditure of Rs.200 on buying 20 units. Calculate price elasticity of demand by the percentage method. Comment upon the shape of demand curve based on this information. (4)

(b) A consumer buys 14 units of a good at price of Rs.8 per unit. At price Rs.7 per unit he spends Rs.98 on the good. Calculate price elasticity of demand by the percentage method. Comment upon the shape of demand curve based on this information.

© A consumer buys 8 units of a good at a price of Rs.7 per unit. When price rises to Rs.8 per unit he buys 7 units. Calculate price elasticity of demand through the expenditure approach. Comment upon the shape of demand curve based on this information.

- Q58. A consumer consumes only two goods X and Y and is in equilibrium. Price of X falls. Explain the reaction of the consumer through the utility analysis.(3)

Q.59 Explain the difference between (i) inferior goods and normal goods and (ii) cardinal utility and ordinal utility. Give example in each case.(6)

Q60. (a) Define a budget line. When can it shift to the right?(4)

(b) Define an indifference map. Why does indifference curve to the right show more utility? Explain. (4)

(c) What is budget set? Explain what can lead to change in budget set.(4)

2012-13

Q61. When is the demand for a good said to be perfectly inelastic? (1)

Q62. What does a rightward shift of demand curve indicate? (1)

Q63.(a) What is a budget line? Why is it downward sloping?(3)

(b) Explain the conditions of consumer's equilibrium under utility analysis.(3)

Q64. How is the demand for a good affected by a rise in the prices of other goods? Explain.(3)

Q65. (a)When the price of a commodity falls by 20 percent, its demand rises from 400 units to 500 units. Calculate its price elasticity of demand.(4)

(b) Price elasticity of demand of a good is - 0.75 . Calculate the percentage fall in its price that will result in 15 percent rise in its demand. (4)

Q66.Explain three properties of indifference curves. (6)

OR

Explain the conditions of consumer's equilibrium under indifference curve approach. (6)

2013-14

Q67. Define indifference curve. (1)

Q68. When the price of a good falls from Rs 10 to Rs 8 per unit, its demand rises from 20 units to 24 units. What can you say about price elasticity of demand of the good through the expenditure approach?(3)

Q69. A consumer consumes only two goods X and Y and is in equilibrium. Show that when the price of good X rises, the consumer buys less of good X. Use utility analysis.(4)

OR

Given the price of a good, how will a consumer decide as to how much quantity of that good to buy? Use utility analysis.

Q70. Give the meaning of inferior good and explain the same with the help of an example.(4)

Q71. Explain why is an indifference curve (a) downward sloping and (b) convex.

OR

Explain the concept of Marginal Rate of Substitution with the help of a numerical example. Also explain its behavior along an indifference curve.(6)

Q72. Give the meaning of 'inelastic demand'.(1)

Q73.When the price of a good rises from Rs10 to Rs12 per unit, its demand falls from 25 units to 20 units. What can you say about price elasticity of demand of the good through the expenditure approach? (3)

Q74. How does change in price of a substitute good affect the demand of the given good? Explain with the help of an example. (4)

Q75. What is meant by monotonic preferences? (1)

Q76.How does change in price of a complementary good affect the demand of the given good? Explain with the help of an example.(4)

2013-14 C

Q77.Define demand.(1)

Q78. A and B are complementary goods. Explain the effects of change in price of A on demand for B. (3)

Q79. Explain the distinction between the equations of budget line and budget constraint. (4)

Q80. The price elasticity of demand of a good is - 0.5. At a price of Rs.20 per unit its demand is 300 units. At what price will its demand increases by 10 percent? (4)

Q81. Explain the characteristics of indifference curves. (6)

OR

Explain the conditions of consumer's equilibrium using utility analysis.

2014-15

Q82. Define indifference curve.(1)

Q83.If due to fall in the price of good X, demand for good Y rises, the two goods are: (1)

- (a) Substitutes.
- (b) Complements
- (c) Not related
- (d) Competitive

Q84. If Marginal Rate of substitution is increasing throughout, the Indifference Curve will be: (1)

- (a) Downward sloping convex
- (b) Downward sloping concave
- (c) Downward sloping straight line
- (d) Upward sloping convex.

Q 85. Explain the significance of 'minus sign' attached to the measure of price elasticity of demand in case of a normal good, as compared to the 'plus sign' attached to the measure of price elasticity of supply. (3)

Q86.A consumer spends Rs 1000 on a good priced at Rs 10 per unit. When its price falls by 20 percent, the consumer spends Rs.800 on the good. Calculate the price elasticity of demand by the Percentage method. (4)

Q87. A consumer consumes only two goods X and Y, both priced at Rs.2 per unit. If the consumer chooses a combination of the two goods with Marginal Rate of Substitution equal to 2, is the consumer in equilibrium? Why or Why not? What will a rational consumer do in this situation? Explain. (6)

OR

A consumer consumes only two goods X and Y whose prices are Rs.5 and Rs 4 respectively. If the consumer chooses a combination of the two goods with marginal utility of X equal to 4 and that of Y equal to 5, is the consumer in equilibrium? Why or why not? What will a rational consumer do in this situation? Use utility analysis.

Q88. Define budget line. (1)

Q89. A consumer spends Rs 100 on a good priced at Rs4 per unit. When its price falls by 25 percent, the consumer spends Rs75 on the good. Calculate the price elasticity of demand by the Percentage method. (4)

Q90. Define Indifference Map. (1)

Q 91. A consumer spends Rs 400 on a good priced at Rs8 per unit. When its price rises by 25 percent, the consumer spends Rs500 on the good. Calculate the price elasticity of demand by the Percentage method. (4)

2015-16

Q92. When does 'change in demand' take place?(1)

- Q93. A consumer consumes only two goods X and Y. Marginal utilities of X and Y are 3 and 4 respectively. Prices of X and Y are Rs4 per unit each. Is consumer in equilibrium? What will be further reaction of the consumer? Give reasons.(3)
- Q94. What will be the effect of 10 percent rise in price of a good on its demand if price elasticity of demand is (a) 0, (b)-1, (c) -2. (3)
- Q95. Define demand. Name the factors affecting market demand. (4)
- Q96. Explain three properties of indifference curves. (6)
- Q97. When does " Change in quantity demanded " take place?(1)
- Q98. A consumer consumes only two goods X and Y. Marginal utilities of X and Y are 4 and 3 respectively. Prices of X and Y are Rs3 per unit each. Is consumer in equilibrium? What will be further reaction of the consumer? Give reasons.(3)
- Q99. Define utility. Explain the Law of Diminishing Marginal Utility.(4)
- Q100. A consumer consumes only two goods X and Y. Marginal utilities of X and Y is 3 . Prices of X and Y are Rs2 and Rs 1 respectively. Is consumer in equilibrium? What will be further reaction of the consumer? Give reasons.(3)
101. Distinguish between individual's demand and market demand. Name the factors affecting demand for a good by an individual.(4)

Introduction - 4 marks

2003-04

- Q1. What are the three central problems of an economy? Why do they arise? (4)

2004-05

- Q2. Explain the problem of "how to produce" with the help of an example.(4)

OR

Explain the problem of "What to produce" with the help of a production possibility curve.

2005-06

- Q3. Define microeconomics.
- Q4. Explain the central problem of 'choice of technique'.(3)

2006-07

- Q5. Explain the central problem of distribution of income. (3)

2007-08

- Q6. Define "Marginal Rate of Transformation".(1)
- Q7. Explain the central problem of the choice of products to be produced.(3)

2008-09

Q8. Give the meaning of opportunity cost. (1)

Q9. Why do problems related to allocation of resources in an economy arise? Explain. (3)

OR

Explain the problem of 'for whom to produce'.

2009-10

Q10. Explain the problem of 'how to produce'.(4)

OR

Distinguish between microeconomics and macroeconomics. Give examples.

2010-11 (set 1)

Q11. What is Planned economy? (1)

Q12. How is production possibility curve affected by unemployment in the economy? Explain.(3)

2010-11 (set 3)

Q13. Define macroeconomics.(1)

2011-12 (set1)

Q14. Define micro economics. (1)

Q15. Define production possibilities curve. Explain why it is downward sloping from left to right.(3)

(set2)

Q16. Explain the central problem of 'How to produce'. (3)

(set 3)

Q17. What is Opportunity Cost? Explain with the help of an example. (3)

2012-13(set 2)

Q18. Explain the meaning of Opportunity cost with the help of production possibility schedule. (4)

OR

With the help of suitable example explain the problem of 'for whom to produce'.

2013-14

Q19. The government has started promoting foreign capital. What is its economic value in the context of production possibilities frontier? (1)

Q20. Why is Production Possibilities Curve concave? Explain. (3)

2013 -14 C

Q21. Name the economic value achievable when attempts are made to increase resources in the Country. (1)

Q22. Why does the problem of 'How to produce' arise? Explain. (3)

2014-15

Q23. Giving reason comment on the shape of Production Possibilities Curve based on the following schedules : (3)

Good X(units)	0	1	2	3	4
Good Y(units)	30	27	21	12	0

Q24. What is likely to be the impact of 'Make in India' appeal to the foreign investors by the Prime Minister of India, on the production possibilities frontier of India? Explain.(3)

OR

What is likely to be the impact of efforts towards reducing unemployment on the production potential of the economy? Explain.

2015-16

Q25. Why do central problems of an economy arise? Explain the Central problem of " for whom to produce"? (6)

Q26. Draw a production possibility curve. What does a point below this curve indicate ? Explain.

OR

Explain the problem of ' What to produce' with the help of an example.

NOTES

ECONOMY: A system in which a man earns its living or

A system which provides people with the means to work and earn a living.

ECONOMICS : It is a science which studies human behavior as relationship between ends and scarce resources which have alternative uses.

MICRO ECONOMICS: The branch of economics which deals with the individuals is known as microeconomics. It is also known as price theory.

MACRO ECONOMICS: The branch of economics which deals with the aggregates of economic system is known as macro economics. It is also known as income theory.

Distinguish between Micro and Macro economics.

Microeconomics	Macroeconomics
The branch of economics which deals with the individuals is known as microeconomics.	The branch of economics which deals with the aggregates of economics system is known as macroeconomics.
It is known as price theory	It is known as income theory/ income analysis.
Its main tools are demand and supply.	Its main tools are aggregate demand and aggregate supply.
It is based on assumption other things being equal.	It is based on the assumption mutual interdependence among various economic variables.

SCARCITY: When demand is more than supply, then it is called as scarcity.

CHOICE: Selecting the best possible way of doing a job.

OPPORTUNITY COST: It is the value of the best alternative foregone.

Q.What is an economic problem? Why does it arise?

A. Economic problem is the problem of how to use our limited and scarce resources in order to get maximum satisfaction.

It arises due to following reasons:

1. **Unlimited human wants:** The wants of human beings are unlimited. As soon as one want gets satisfied many new wants come up. As a result of this, economic problem arises.
2. **Limited Resources:** The available resources are limited and scarce in comparison to the unlimited human wants. As a result of this, economic problem arises.
3. **Means have alternate uses:** Resources have alternate uses. The resources are not only limited but also have alternate (many) uses. As a result of this economic problem arises.

ECONOMISING OF RESOURCES: mean making the best possible use of the available resources.

Positive economics and normative economics or issues:

Positive economic studies the facts of life, i.e. it deals with things as they are. Positive economics deals with what are the economic problems and how are they actually solved. For example, India is an overpopulated country or prices are constantly rising.

Normative economic tells us what ought to be. Normative economics deals with what ought to be or how the economic problems should be solved. For

Example, India should not be overpopulated country or prices should not rise.

PROBLEMS OF AN ECONOMY:

There are three central problems:

- 1 - Allocation of resources:
 - a) what to produce
 - b) How to produce
 - c) For whom to produce.

2 - Fuller utilization of resources.

3 - Economic efficiency.

4 - Economic Growth.

Allocation of resources : An economy has to reallocate scarce resource in such a way that serves the best needs of society. This problem relates to the production of commodities (What, how and for whom to produce).

What to produce

It is also known as choice of products. According to this problem an economy has to decide about what type of goods and in what quantities are to be produced with given resources and technology. An economy has limited resources and thus, cannot produce all the goods. More of one good or service usually means less of others. For eg.

(a) Whether it should produce consumer goods or capital goods

(b) Whether, it should produce more of consumer goods and less of capital goods and vice-versa.

How to produce

It is also called as choice of technique or choice of method of production. According to this problem an economy has to make a choice between technique of production i.e., it has to decide about the technique of production adopted by the production unit in the production of good and services with the given resources. There are two methods of production:

- Capital intensive method/ technique : there is more capital and less labour utilization.
 - labour intensive method/technique : there is more labour and less capital utilization.
- If labour intensive method provide employment opportunities ,then capital intensive method provide better and fast production. Availability of factors and their relative prices helps in determining in the technique to be used.

For whom to produce

This problem relates to the distribution of goods and services produced. Since resources are limited all goods and services needed by the people cannot be produced. Whatever is produced it cannot be in unlimited quantity. How should the produce of the economy be distributed among individuals in the economy? Who gets more and who gets less? This depends upon who earns how much. So it is a problem of distribution of income. To solve this problem taxation system is implemented in progressive method.

The problem can be categories under two main heads:

1. Personal distribution: It means how national income of an economy is distributed among different groups of people.

2. **Functional distribution:** It refers to distribution of national product among different factors of production.

Full utilization resources

This is the problem of how to achieve full employment resources. It is important that resources should not remain idle as it implies wastage of resources. The problem is to ensure full employment of all resources (especially labour).

Economic efficiency

This is the question of how to obtain efficiency in the utilization of resources and distribution of what has been produced. This is the problem of efficiency in production and distribution systems.

Economic growth

This is the question of whether the economy's capacity to produce goods and services is growing from year to year or is it remaining static. Economic growth is induced by saving and investment.

Market economy and centrally planned economy

On the basis of economic activities, economics can be broadly classified as:

- Market economy is the one in which the means of production are owned, controlled and operated by the private sector. This economy is also known as capitalist economy.
- Centrally planned economy refers to an economy in which means of production are owned, controlled and operated by the government. This economy is also known as socialist economy.

Basic	Market economy	Centrally economy
Meaning	It refers to an economy in which the means of production are owned, controlled and operated by the private sector.	It refers to an economy in which the means of production are owned, controlled and operated by the government.
Ownership	All the means of production(land, labour, capital and enterprise) are private property.	Means of production are owned by the government in case of centrally planned economy.

Decision making	Decisions regarding consumption, production and investment are made independently in the market economy.	Decision making is done by the government only.
Competition	There exists stiff competition among the firms.	There does not exist any element of competition under centrally planned economy.
Role of government	Government does not play any role.	Government plays the complete role.

PRODUCTION POSSIBILITY CURVE / FRONTIER : It is a curve or graphical presentation which shows all possible combinations in producing two goods that an economy can produce with given resources and technology.

Assumptions of PPC:

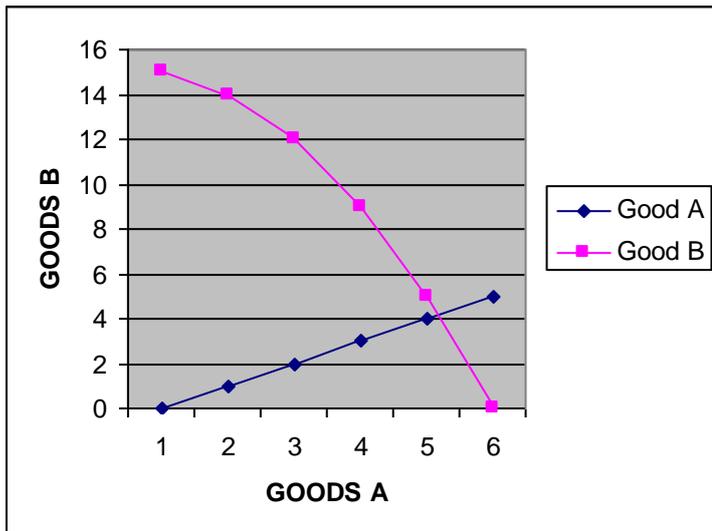
The production possibility curve is based upon the following assumption -

- 1) An economy produces only two goods.
- 2) The resources are given or limited.
- 3) All the productive resources are fully employed.
- 4) Technique of production is given and does not change at all.

For e.g., Suppose an economy produces only two goods say Goods A and Good B with given resources & technology. The following schedule depicts the production possibilities of two goods.

Combinations	Good A	Good B
A	0	15

B	1	14
C	2	12
D	3	9
E	4	5
F	5	0



Characteristics of Production Possibility Curve:

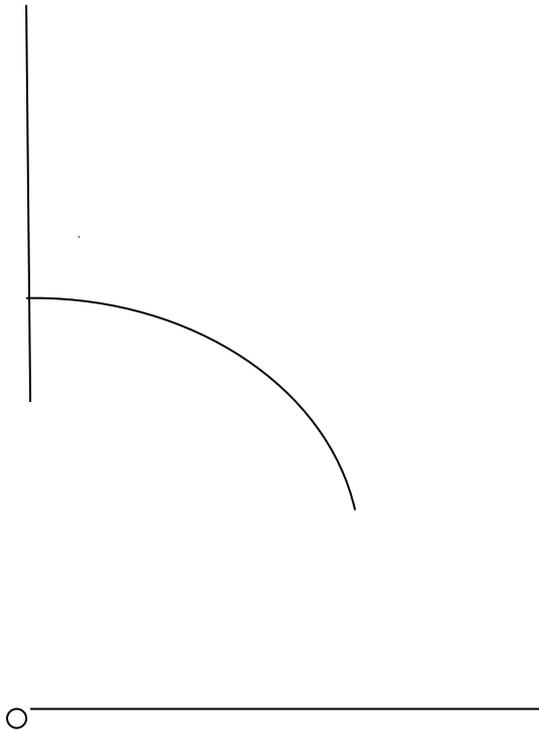
1. Slopes downward from left to right : PPC slopes downward to the right which shows that economy sacrifices the production of one commodity in order to have more quantity of the other. This ratio of more quantity of one in place of another is known as marginal rate of transformation (MRT).
2. Concave to the origin : PPC is concave to the origin because there applies law of increasing Opportunity Cost. The law of increasing opportunity cost quantity of another commodity.

Central problems and production possibility curve:

PPC is a graphic technique that helps in explaining central problems of an economy.

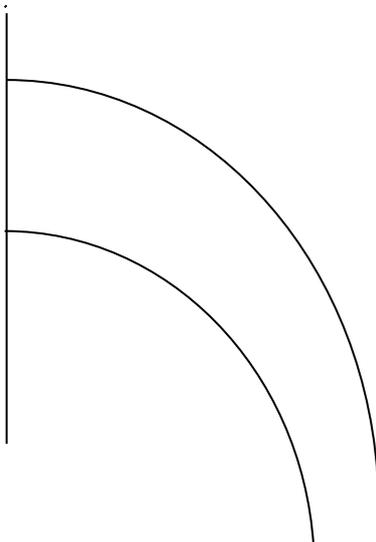
1. What and how much to produce: PPC helps in determining what and how much quantity of commodities should be produced. With the given resources and the state of technology, and economy can produce any combinations of goods between A,B,C,D,& E. If society chooses combinations like A,B,C, it means society decides to produce more of wheat and less of cloth. But if we choose combination E&F, it tends to produce more of cloth.

2. Problem of fuller and efficient use of resources: PPC helps in efficient utilization of society's given resources. Any point falling on AF is efficient utilization of resources and any combination below this curve would mean unemployment or under utilization of resources as shown at point K in the diagram.



In this figure at point K, less quantity of both are produced which means resources are underutilized.

3. Problem of scarcity: This can also be highlighted through PPC. For example if economy needs combination 'U' in the diagram, it needs more of cloth and wheat. It lies beyond PP frontier and economy is unable to produce it with given resources. It is an indicator of scarcity of resources as per requirement of the economy.
4. Problem of growth of resources: PPC also helps in measuring economic growth of the economy. Growth of resources is indicating through rightward shift of production possibility curve. It is explained through adjacent diagram.



○

Shapes of PPC:

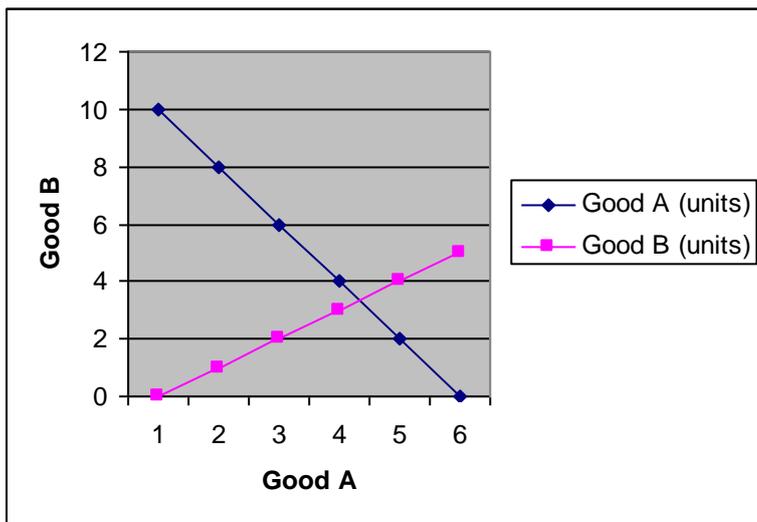
Combination	Good A (units)	Good B (units)	MOC
A	15	0	-
B	14	1	1:1
C	12	2	2:1
D	9	3	3:1
E	5	4	4:1
F	0	5	5:1

a) Generally production possibility curve is concave to the origin. It is due to the increasing marginal opportunity cost.(MRT)



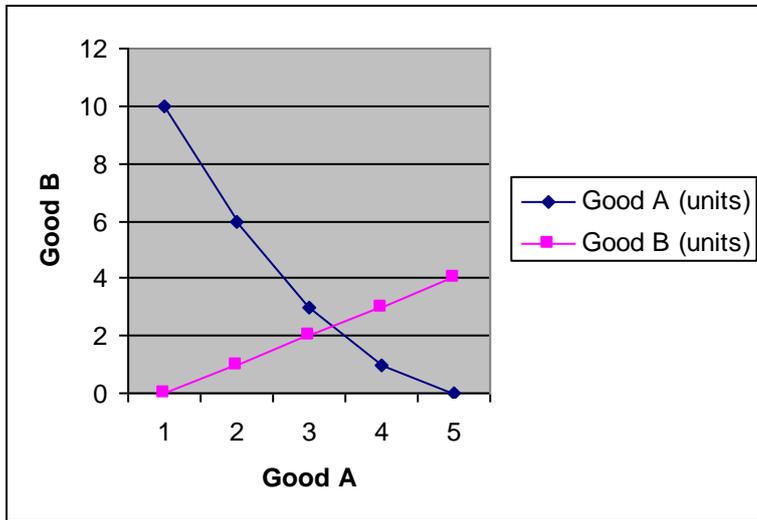
b) PPC can be a straight line also. When MRT is constant.

Combination	Good A (units)	Good B (units)	MOC
A	10	0	-
B	8	1	2:1
C	6	2	2:1
D	4	3	2:1
E	2	4	2:1
F	0	5	2:1



c) PPC may also be convex to the origin. When there is a decreasing MRT.

Combination	Good A (units)	Good B (units)	MOC
A	10	0	-
B	6	1	4:1
C	3	2	3:1
D	1	3	2:1
E	0	4	1:1



Producer's equilibrium, supply (16 marks)

2003-04

- Q1. List any three determinants of supply of a commodity.(3)
- Q2. Give three reasons for a rightward shift of supply curve of a commodity.(3)
- Q3. State any three causes of a leftward shift of supply curve.(3)
- Q4. What is meant by returns to scale? Give one reason for increasing returns to scale.(3)
- Q5. Draw Average Revenue and Marginal revenue curves of a firm under
(a) Perfect competition (b) Monopoly. (3)
- Q6. What is the likely effect on the supply of a good if the prices of the inputs used in production of that good fall? Explain.(3)
- Q7. Explain the law of supply. Use diagram.(3)
- Q8. Explain the effect of a decrease in supply of a commodity on its price.(3)

OR

Explain the effect of an increase in supply of a commodity on its price.

- Q9. Explain the relationship between marginal cost and average cost with the help of a cost schedule.(4)

OR

Distinguish between fixed costs and variable costs. Give two examples of each.

- Q10. Explain the law of variable proportions with the help of total product and marginal product curves.(6)
- Q11. To increase the production of a good, only one input is increased while other inputs are held constant. Explain its effects on total physical product. Give reasons.(6)

OR

Explain 'returns to scale' with the help of numerical examples

Q12. Explain the geometric method of measuring price elasticity of supply. Use diagrams. (6)

2004-05

Q13. What is meant by producer's equilibrium?(1)

Q14. What causes an upward movement along a supply curve?(1)

Q15. Define production function.(1)

Q16. Give three causes of an increase in the supply of a commodity.(3)

Q17. What is the relationship between marginal revenue and average revenue?(3)

Q18. Define price elasticity of supply. How is it measured by geometric method? (In case of a straight line supply curve).(4)

Q19. Complete the following table : (4)

Output	Total Cost	AVC	MC
0	80		
1	180		
2	270		
3	350		
4	440		

Q20. Complete the following table: (4)

Output	Total cost	AVC	MC
0	50		
1	80		
2	100		
3	125		
4	158		

Q21. Distinguish between returns to a factor and returns to scale. Explain the reasons for increasing returns to a factor.(6)

Q22. What causes a downward movement along a supply curve?(1)

Q23. What is the relationship between marginal revenue and total revenue?(3)

Q24. Complete the following table: (4)

Output	Total cost	AVC	MC
0	60		
1	110		
2	150		
3	180		
4	220		

2005-06

Q25. The quantity supplied of a commodity at a price of Rs.8 per unit is 400 units. Its price elasticity of supply is 2. Calculate the price at which its quantity supplied will be 600 units .(4)

Q26. When the price of a commodity falls from Rs.10 per unit to Rs.9 per unit, its quantity supplied falls by 20 percent. Calculate its price elasticity of supply.(4)

Q27. The price of a commodity is Rs.5 per unit and its quantity supplied is 600 units. If its price rises to Rs.6 per unit, its quantity supplied rises by 25 percent. Calculate its price elasticity of supply.(4)

Q28. Complete the following table: (4)

Output	Price	Total Revenue	Marginal Revenue
1	7		
2	6		
3	4		
4	2		

Q29. Complete the following table (4)

Output	Total Revenue	Marginal Revenue	Average Revenue
1	14		
2	24		
3	24		
4	16		

Q30. Complete the following table: (4)

Output	Marginal Revenue	Total Revenue	Average Revenue
1	10		
2	8		
3	0		
4	-2		

Q31. The quantity supplied of a commodity at a price of Rs.8 per unit is 400 units. Its price elasticity of supply is 2. Calculate the price at which its quantity supplied will be 600 units.(4)

Q32. When the price of a commodity falls from Rs.10 per unit to Rs.9 per unit, its quantity supplied falls by 20 percent. Calculate its price elasticity of supply.(4)

Q33. The price of a commodity is Rs.5 per unit and its quantity supplied is 600 units. If its price rises to Rs.6 per unit, its quantity supplied rises by 25 percent. Calculate its price elasticity of supply.(4)

2006-07

Q34. Complete the following table.

1	10	10	10
2		8	
3	8		
4		0	
5			20

Q35. Complete the following table:

Price	Output	TR	MR
7		7	
	2	10	

	3		(-)1
1			(-)5

Q36. Complete the following table:

Price	Output	TR	MR
	1	6	
4			2
	3	6	
1			(-)2

2007-08

Q37. Define production function.

Q38. What is market supply?

Q39. What is the likely effect on the supply of a good if a unit tax is imposed on that good? Explain.(3)

Q40. What is the likely effect of technological progress on the supply of a good? Explain.(3)

Q41. Explain the effect of increase in excise tax on supply. Show the same on a diagram.(3)

Q42. Complete the following table:

Price	output	TR	MR
10	1		
	2	14	
	3		1
	4	12	

Q43. Explain producer's equilibrium using a schedule. Use total cost and total revenue approach.

OR

Distinguish between (i) fixed cost and variable cost giving examples and (ii) average cost and marginal cost giving an examples.(4)

Q44. Draw supply with price elasticity of supply throughout equal to (i) zero, (ii)one,(iii) infinity and (iv) less than one.(6)

Q45. Explain, with the help of numerical examples, the effect on total output of a good when all the inputs used in production of that good are increased simultaneously and in the same proportion. (6)

2008-09

Q46. Give one reason for a rightward shift in supply curve. (1)

Q47. Why is average total cost greater than average variable cost? (1)

Q48. Define fixed costs.(1)

Q49. Explain the effect of fall in prices of other goods on the supply of a given good. (3)

Q50. Complete the following table: (3)

Output (units)	Total cost	AVC	MC
1	90		30
2		27	

3			27
4	180	30	

Q51. The price of commodity X is Rs. 20 per unit and it remains constant. Given below is the cost schedule of one of its producers. Find out the level of output at which this producer is in equilibrium. Give reasons for your answer. (4)

Output (units)	1	2	3	4	5	6	7
Total cost (Rs.)	26	45	60	76	94	114	142.

Q52. Giving reasons, state whether the following statements are true or false: (6)

- (i) when there are returns to a factor, marginal product and total product both always diminish.
- (ii) When marginal revenue is positive and constant, average and total revenue will both increase at constant rate.
- (iii) As output is increased, the difference between average total cost and average variable cost falls and ultimately becomes zero.

Q53. Define marginal cost. (1)

Q54. Complete the following table: (3)

Output (units)	Price (Rs.)	Marginal Revenue (Rs.)	Total Revenue (Rs.)
1		16	
2	12		24
3		6	
4	7		28

Q55. The price elasticity of supply of commodity Y is half the price elasticity of supply of commodity X. 16 percent rise in the price X results in a 40 percent rise in its supply. If the price of Y falls by 8 percent, calculate the percentage fall in its supply. (4)

Q56. Explain the conditions of producer's equilibrium with the help of total cost and total revenue schedule. (4)

Q57. Giving reasons, state whether the following statements are true or false: (6)

- (i) Average cost falls only when marginal cost falls.
- (ii) The difference between average total cost and average variable cost is constant.
- (iii) When total revenue is maximum, marginal revenue is also maximum.

2009-10

Q58. A firm's average fixed cost, when it produces 2 units, is Rs.30. Its average total cost schedule is given below. Calculate its marginal cost and average variable cost at each level of output. (3)

Output (units)	1	2	3
ATC (Rs.)	80	48	40

Q59. Total revenue is Rs.400 when the price of the commodity is Rs.2 per unit. When price rises to Rs.3 per unit, the quantity supplied is 300 units. Calculate the price elasticity of supply. (3)

Q60. State whether the following statements are true or false. Give reasons for your answer: (6)

- (i) When marginal revenue is constant and equal to zero, then total revenue will also be constant.
- (ii) As soon as marginal cost starts rising, average variable cost also starts rising.

- (iii) Total product always increases whether there is increasing returns or diminishing returns to a factor.

Q61. From the following schedule find out the level of output at which the producer is in equilibrium, using marginal cost and marginal revenue approach. Give reasons for your answer.(6)

Price per unit (Rs.)	Output (units)	Total cost (Rs.)
8	1	6
7	2	11
6	3	15
5	4	18
4	5	23

OR

Explain the law of returns to a factor with the help of total product and marginal product schedule.

2010-11

Q62. What is decrease in supply.(1)

Q63. Define production function. (1)

Q64. Draw in a single diagram the average revenue and marginal revenue curves of a firm which can sell any quantity of the good at a given price. Explain. (3)

Q65. Distinguish between explicit cost and implicit cost and give examples. (3)

Q66. Define marginal cost. Explain its relation with average cost.(4)

OR

Define variable cost. Explain the behaviour of total variable cost as output increases.

Q67. What is producer's equilibrium? Explain the conditions of producer's equilibrium through the marginal cost and marginal revenue approach. Use diagram.(6)

2011-12

Q68. What is the behavior of Marginal Revenue in a market in which a firm can sell any quantity of the output it produces at a given price?(1)

Q69. What is the behavior of Total variable cost, as output increases?(1)

Q70. (a) A farmer takes a farm on rent and carries on farming with the help of family members. Identify explicit and implicit costs from this information. Explain.(3)

(b) A producer borrows money and starts a business. He himself looks after the business. Identify implicit and explicit costs from this information. Explain. (3)

(c) A producer starts a business by investing his own savings and hiring the labor. Identify implicit and explicit costs from this information. Explain.(3)

Q71. Draw Total Variable Cost, Total Cost, and Total fixed Cost curves in a single diagram.(3)

Q72. What does the Law of Variable Proportions show? State the behavior of marginal product according to this law.(6)

OR

Explain how changes in prices of inputs influence the supply of a product.

Q73. Explain the distinction between "change in quantity supplied" and "change in supply". Use diagram.(6)

2012-13

Q74. Define marginal revenue.(1)

Q75. Give one reason for "decrease" in supply of a commodity. (1)

Q76. The price elasticity of supply of a commodity is 2. A firm supplies 200 units of it at a price of Rs.8 per unit. At what price will it supply 250 units?(3)

Q77. From the following table, find out the level of output at which the producer will be in equilibrium. Give reasons for your answer.(3)

Output (units)	Marginal Revenue	Marginal Cost
1	8	10
2	8	8
3	8	7
4	8	8
5	8	9

Q78. Giving reasons, state whether the following statements are true or false: (6)

- (i) Average product will increase only when marginal product increases.
- (ii) With increase in level of output, average fixed cost goes on falling till it reaches zero.
- (iii) Under diminishing returns to a factor, total product continues to increase till marginal product reaches zero.

Q79. Give the meaning of market supply.(1)

Q80. A 15 percent rise in the price of a commodity raises its supply from 300 units to 345 units. Calculate its price elasticity of supply.(3)

2013-14

Q81. Define marginal product. (1)

Q82. What is market supply of a product?(1)

Q83. Explain how technological progress is a determinant of supply of a good by a firm.(3)

OR

Explain how input prices are a determinant of supply of a good by a firm.

Q84. Why is Average Revenue always equal to price?(3)

Q85. Giving reasons, explain the "Law of variable proportions"(4)

Q86. From the following information about a firm, find the firm's equilibrium output in terms of marginal cost and marginal revenue. Give reasons. Also find profit at this output.(6)

Output (units)	Total Revenue	Total cost
1	6	7
2	12	13
3	18	17
4	24	23
5	30	31

Q87. Define marginal revenue. (1)

Q88. Define variable cost. (1)

2013-14 C

Q89. Give two examples of fixed costs. (1)

Q90. Calculate marginal cost at each level of output: (3)

output	1	2	3	4	5	6
AVC	12	11	10	9	9	10

Q91. When price of a commodity rises from Rs.5 to Rs.6 per unit, total revenue increases from Rs.1000 to Rs.1200. Calculate its price elasticity of supply.(3)

Q92. Explain any two causes of "decrease" in supply of a commodity. (3)

OR

Explain any two causes of a rightward shift of supply curve.

Q93. From the following data find out the level of output at which the producers is in equilibrium. Give reasons for your answer. (Use marginal cost, marginal revenue approach) (6)

Output (units)	Total Revenue	Total Cost
1	12	14
2	24	26
3	36	36
4	48	48
5	60	62

2014-15

Q94. What is the behavior of (a) AFC and (b) AVC as more and more units of a good are produced? (4)

OR

Define Average Revenue. Show that Average Revenue and Price are same.

Q95. What are the different phases in the Law of variable proportions in terms of marginal product? Give reason behind each phase. Use diagram. (6)

Q96. Explain why will a producer not be in equilibrium if the conditions of equilibrium are not met.(6)

2015-16

Q97. What is the relation between Average Variable Cost and Average Total Cost, if Total Fixed cost is zero?(1)

Q98. A firm is able to sell any quantity of a good at a given price. The firm's marginal revenue will be (1)

- (a) Greater than Average Revenue
- (b) Less than Average Revenue.
- (c) Equal to average revenue
- (d) Zero

Q99. Define fixed cost. Give an example. Explain with reason the behavior of Average Fixed Cost as output is increased.

OR

Define marginal product. State the behavior of marginal product when only one input is increased and other inputs are held constant.(4)

Q100. When price of a commodity falls from Rs 12 per unit to Rs 9 per unit, the producer supplies 75 percent less output. Calculate price elasticity of supply. (4)

Q101. Examine the effect of (a) fall in the own price of X good (b) rise in tax rate on good X, on the supply curve. Use diagram.(6)

Q102. What happens to the difference between Average Total Cost and Average Variable Cost as production is increased?(1)

Q103. When price of a good rises from Rs10 to Rs.12 per unit, the producer supplies 10 percent more. Calculate price elasticity of supply.(4)

Q104. What happens to the difference between Total Cost and Total Variable Cost as output is increased?(1)

Q105. When does ' shift' in supply curve take place? (1)

Q106. When price of a good rises from Rs8 per unit to Rs.10 per unit, producer supplies 40 units more. Price elasticity of supply is 2. What is the quantity supplied before the price change? Calculate.(4)

QUESTION BANK

CLASS XI

ENGLISH

RANGA'S MARRIAGE

SHORT ANSWER TYPE QUESTIONS

Q1. Why was there a huge crowd in front of Ranga's home? What did they find on the contrary?.

Q2. Why did the narrator want Ranga to get married? What stopped him to do so for a while?

Q3. What were Ranga's views about marriage?

Q4. Why does the narrator take Ranga to a Shastri? What did the latter tell him about the problem?

Q5. Why did the narrator call Ranga and Ratna a childish couple?

Q6 Describe the raw mango episode.

Q7. Reflect on the two important produce of Hoshalli.

Q8. Why does the narrator call the Indians a flock of sheep?

Q9. Why did Ranga name his child "Shyama"?

Q10. Why does the narrator deviate from the main story?

LONG ANSWER TYPE QUESTIONS:

Q1. What kind of person do you think the narrator is?

Q2. Ranga's views on marriage are quite different, yet he follows the conventional way of choosing a girl for himself. Why does he do so in your opinion?

Q3. Why is it important not to blindly follow what others do or say?

Q4. The narrator succeeds in bringing out the simplicity of the life of the people of Hosahalli. Comment in light of the story "Ranga's Marriage"?

ALBERT EINSTEIN AT SCHOOL

SHORT ANSWER TYPE QUESTIONS

Q1. What was the chief cause of Albert's argument with his history teacher?

Q2. How did Yuri help Albert in getting rid of his school?

Why did Albert not like to stay at his lodgings?

Q4. Who was Elsa? What did she advise Albert to do in order to pass? How did Albert react??

- Q5. Who was Mr. Koch? Why did Albert say that he liked only his classes in the school?
- Q6. How did the certificate of nervous breakdown prove useless to Albert Einstein?
- Q7. How did Albert hope to get admission to an Italian college without a diploma from the German school?
- Q8. What is Einstein's view on education?
- Q9. Maths and Music were Einstein's only delight .Explain ?
- Q10. Yuri called Albert "the world's greatest liar". Do you think this is an insult or a compliment to him? Why?

LONG ANSWER TYPE QUESTIONS:

- Q1. Einstein had a rebellious nature. Quote two instances from the lesson to support this view.
- Q2. Attempt a short pen portrait of Einstein.
- Q3. The school system often curbs individual talents .Discuss.
- Q4. What qualities of head and heart make Yuri the only silver lining in Einstein's dark and depressive life?

BROWNING VERSION

SHORT ANSWER TYPE QUESTIONS

- Q1. Why did Taplow stay back at school?
- Q2. What does Taplow want to do if he gets his remove and why?
- Q3. What is Taplow's opinion about the Greek Tragedy AGAMEMNON?
- Q4. Which situation of Taplow does the science teacher call " bad luck"?
- Q5. " Still there is one comfort," says Frank. What does he mean?
- Q6. How does Taplow get carried away? How does he feel about it?
- Q7. Why does Mr. Frank envy Mr. Crocker Harris?
- Q8. What advice does Mr. Frank give Taplow? Is it safe for Taplow to follow it?
- Q9. What is funny about Taplow's attitude towards Crocker Harris?
- Q10. Why does Frank say " Oh Lord!" and is relieved at seeing Mille Crocker Harris?

LONG ANSWER TYPE QUESTIONS

- Q1. Comment on Taplow's attitude towards Mr. Crocker Harris. Do you approve of it?
- Q2. Frank is neither a good human being nor a good teacher. Do you agree? Give reasons.
- Q3. What different positive values and traits form Taplow's character?
- Q4. What impression do you gather about Crocker Harris' character from the play?

AILING PLANET: THE GREEN MOVEMENT'S ROLE

SHORT ANSWER TYPE QUESTIONS

- Q1. When and where was the ' Green movement' started and what has been its contribution?
- Q2. Why is the Earth compared to a patient?
- Q3. In what way is man " The world's most dangerous animal" ?
- Q4. What do you understand by the concept Sustainable Development?
- Q5. What does the expression "A holistic and ecological view of the world " suggest?
- Q6. How are earth's principle biological systems being depleted?
- Q7. Explain "Forests precede mankind, deserts follow".
- Q8. " what goes under the pot now costs more than what goes inside it". Explain.

- Q9. What according to the author is the transcending concern today?
Q10. How has population increased after the year 1800?

LONG ANSWER TYPE QUESTIONS

- Q1. Why does the author say that the growth of world population is one of the strongest factors distorting the future of human society?
Q2. What is the essence of Margaret Thatcher's statement quoted by Palkhiwala in his essay?
Q3. "Are we to leave our successors a planet of advancing desserts, impoverished landscapes and an ailing environment." Elucidate.
Q4. "The emerging new world vision has ushered in the era of responsibility". Explain.

CHILDHOOD

SHORT ANSWER TYPE QUESTIONS

- Q1. What according to the poet is involved in the process of growing up?
Q2. What is the poet's feeling towards Childhood?
Q3. What impression does the child form about the double faced nature of the adults?
Q4. What according to you is the most poetic line of the poem and why?
Q5. Why do you think the poet feels that his childhood had hidden itself in an infant's face?
Q6. How has adult hypocrisy shattered the innocence of the child like behavior?

EXTRACTS

- I. Was it the day I ceased.....was that the day!
a) Why were hell and heaven not found in geography book?
b) Why does the poet mention the age of eleven?
c) What is the problem that grips the mind of the poet?
d) Find word from the extract which mean 'ended'?
- II. Was it the time I realized so lovingly,
a) Do you think the poet feels so bad at the loss of his childhood?
b) What does the poet experience about the adults?
c) What is the difference between they talk of and what they do?
d) Explain " but did not act so lovingly"
- III. Was it when I found..... and mine alone
a) Explain " my mind was really mine".
b) How could he use his mind?
c) What kind of thoughts could he produce?
d) Point out an internal rhyme pair?

LABURNUM TOP

SHORT ANSWER TYPE QUESTIONS

- Q1. How was the Laburnum top before the bird arrived?
Q2. To whom is the bird compared to?
Q3. How does the whole tree tremble and trill?
Q4. What happens to the laburnum tree when the bird flies away?
Q5. Explain "barred face identity masked "?

Q6. Describe the relationship between the laburnum tree and the goldfinch?

EXTRACTS

I. The laburnum top is silent, quite still
In the afternoon yellow September sunlight,
A few leaves yellowing, all its seeds fell.
Till the goldfinch comes, with a twitching chirrup
A suddenness, a startlement, at a branch end.

- Why does the poet say 'yellow afternoon'?
- Which season has been referred in the extract?
- Why does the bird come with a twitching chirrup?
- Name the poetic device in the last line.

II. Then sleek as a lizard, and alert, and abrupt,
She enters the thickness, and a machine starts up
Of chitterings, and a tremor of wings, and trillings—
The whole tree trembles and thrills.
It is the engine of her family.

- Name the poetic device in the first line.
- Why does the whole tree tremble?
- Name two words of sound from the extract?
- What was in the thickness of the tree?

CLASS XI

GEOGRAPHY

ASSIGNMENT 1 - BOOK A

Chapter 1 – Geography As A Discipline

- How is the old concept of geography different from new concept of geography?
- Explain the four branches of Physical Geography.
- Explain four branches of Human Geography
- Explain four branches of Biogeography.
- How is Regional geography different from Systematic geography?

Chapter 2 – The Origin & Evolution of the Earth

- Explain the Big Bang theory regarding the development of the Universe.
- Explain the theory regarding the formation of the moon.
- What is the age of the Earth?
- Explain the theory regarding the origin of the Earth.

Chapter 3 – Interior of the Earth

- What is the earth's radius in km?

2. Why is the knowledge about the interior of the earth indirect?
3. Name the deepest gold mine in the world.
4. Name the two major project on which the Scientist are working.
5. What do you mean by earthquake? Explain the three earthquake waves with help of diagram.
6. What do you mean by Seismologist? Explain how the earthquake intensity is measured.
7. Explain the structure of the earth with the help of diagram.
8. How the volcanic rock is different from plutonic rock?
9. How gravitational force, magnetic field and seismic activity do helps to understand the interior structure of the earth?
10. With the help of suitable diagram, discuss the structure of the earth.
11. Define the two types of endogenic processes.
12. Give one word for the following statements-
 - a) A type of volcano which develops cinder cone.
 - b) Explosive volcanoes, which collapse on themselves, rather than building any tall structures.
 - c) Central portion of ridge experiences frequent eruptions.
 - d) Rocks cooling in the crust
 - e) Large body of magmatic material that cools in the deeper depths of crust and forms into large domes.
 - f) A type of intrusive landform that led the development of Deccan traps.

Chapter 4- Distribution of Oceans and Continents

1. Discuss briefly the major difference between Continental Drift Theory and Plate Tectonics.
2. Discuss the division of the ocean floor.
3. Discuss the three types of plate's boundaries.
4. On a World map, mark the following-
 - a) 7 continents
 - b) World oceans
 - c) Major & minor plates along with three boundaries
 - d) Red Sea, Black Sea, Mediterranean Sea, Baltic Sea & Caspian Sea.
 - e) Major Earthquake and Volcanic zones.

Chapter 5- Minerals and Rocks

1. Classify the major minerals under the following heads in a tabular form- Name of the mineral; Major elements; Properties/ Characteristics; Uses
2. What are Rocks? How is it different from Minerals?
3. Briefly discuss the formation of three types of rocks. Give a self-explanatory diagram of rock cycle.

1. What is Diastrophism? Discuss its types.
2. What is weathering? Write a short note on the significance of this process.
3. Why debris avalanches and landslides occur very frequently in the Himalayas as compared to Western Ghats and Nilgiris.
4. Give one word for the following statements-
 - a) Force applied per unit area.
 - b) Weathering of rocks due to combination of mineral with oxygen to form oxides or hydroxides.
 - c) Large smooth rounded domes resulted due to unloading and expansion.
 - d) Salt in rocks expands due to thermal action, hydration and crystallisation.
 - e) Water or acid with dissolved contents.
5. What are Mass Movements? Discuss the two major classes of mass movements.
6. Q6. Discuss the soil formation. Enlist the factors controlling the formation of soils.

Chapter 7- Landforms and their Evolution

Q1. On the basis of different geomorphic regimes, classify the Erosional and Depositional Landforms of each along with suitable diagrams.

Chapter 8- Atmosphere- Composition & Structure

1. Define Atmosphere. Discuss its 3 stages of evolution. Briefly discuss the components of atmosphere. Q2.
2. Distinguish between Weather & Climate
3. Draw a well explanatory diagram of structure of the Earth. Q4.
4. Give one word for the following-
 - a) Acts as a blanket to the earth, allowing the temperatures to be neutral.
 - b) Large particles responsible for red and orange colors at sunrise and sunset.
 - c) Temperatures drop at rate of 1°C for 165m of height.
 - d) Suitable temperature conditions for flying jet crafts.
 - e) Radio waves transmitted from this layer to earth & reflected back.
 - f) Layer extending above mesopause and continues till the edge.

Chapter 10- Atmospheric Circulation

Q1. What do you mean by Atmospheric pressure? State the standard pressure at sea level. Q2. Explain the vertical variation of Pressure.

Q3. Explain the following terms: - (a) Pressure Gradient Force (b) Coriolis force (c) Geostrophic wind

Q4. Explain the pressure Belt with the help of diagram. Q5. Explain land & sea Breezes with the help of diagram.

Q6. Explain Mountain & Valley Breezes with the help of diagram. Q7. Distinguish between tropical and temperate cyclone.

Chapter 11 – Water in the Atmosphere

- Q1. Explain the types of rainfall with the help of diagram.
Q2. Explain the types of clouds on the basis of height and appearance. Q3. Explain the distribution of Rainfall in different parts of the world. Q4. What do you mean by sublimation?
Q5. How Evaporation is different from Condensation?
Q6. Distinguish between Absolute Humidity & Relative Humidity.

Chapter 14- Movements of Ocean water.

- Q1. What do you mean by sea wave? Explain two factors which affect sea waves. Q2. Explain five major characteristics of waves with the help of diagram.
Q3. Why the tides delayed everyday by 50 minutes? Q4. What do you mean by ocean currents?
Q5. Explain Warm & Cold Ocean current while giving two example of each.
Q6. How do currents affect the temperature? How does it affect the temperature of coastal areas in the N.W. Europe?

Chapter : 15 Life on the Earth

- Q1. How Ecology is different from Ecosystem?
Q2. How Food chain is different from Food Web?
Q3. What do you mean by Ecological Balance? How it is disturbed ?

Chapter 16 – Bio-diversity & Conservation

- Q1. What do you mean by Bio-diversity?
Q2. What do you mean by conservation of resources?
Q3. Why the conservation of natural resources is essential?
Q4. Explain the number of pyramid with respect to Food chain with the help of diagram.

GEOGRAPHY

CLASS XI

INDIA: - PHYSICAL ENVIRONMENT

Chapter 1- India Location

- Q1. Explain the geographical extent of India with respect to Latitudes, Longitudes & Areas.
Q2. “India is neither a Pigmy nor a giant”. Elaborate this statement.
Q3. What is sub-continent? Name the states which are making India as sub-continent with respect to bordering countries.

Chapter 2- Structure & Physiography

- Q1. Explain the concept for the formation of Himalayas.
Q2. Distinguish between the following pairs:-
a) Himalayas Mountain & Peninsulas Plateaus
b) Eastern & western Coastal Plain
c) Horst & Rift Valley.
Q3. Explain the complexity of Himalayas with the help of diagram.
Q4. Explain the major characteristics of Northern plain of India.

Chapter 3- Drainage System

- Q1. How the Antecedent Drainage is different from consequent drainage system?
- Q2. Explain four drainage patterns with the help of diagram.
- Q3. Distinguish between the following pairs:-
- Himalayan Rivers & Peninsular Rivers
 - Eastern & Western flowing rivers of peninsular India.

Chapter 4- Climate of India

- Q1. How the climate is different from weather?
- Q2. Explain the Mechanism of Indian Monsoon.
- Q3. Explain why Tamilnadu does not receive rainfall by S.W. Monsoon but get rainfall by Retreating Monsoon.
- Q4. Why Cherapunji receives more than 1080 cm rainfall?
- Q5. State the three causes of Global warming.

Chapter 5- Natural Vegetation

- Q1. Define Natural Vegetation. State the factors which affect the natural vegetation.
- Q2. Explain the major characteristics of Evergreen tropical forest.
- Q3. Explain the main features of Tropical Deciduous forests.
- Q4. Why there is success of Natural Vegetation in the Himalayan region?
- Q5. What steps are taken by states and central government to conserve forest wealth?
- Q6. What do you mean by Bio-sphere Reserve? Name four important Biosphere centers of India.

Chapter 6- Soil

- Q1. What do you mean by alluvial soil? Explain its major characteristics & where it is found in India?
- Q2. Explain the main features of Black Soil & where it is found?
- Q3. What do you mean by Laterite soil? Explain three important features & where it is mainly confined.
- Q4. Explain the factors which are responsible for soil conservation.
- Q5. How Gullies erosion is different from sheet erosion.

Chapter 7- Natural Hazards & Disasters

- Q1. Define the following terms:-
- Tsunami
 - Earthquake
 - Disasters
- Q2. Distinguish between
- Tropical & Temperate Cyclone
 - Cyclone & Anticyclone
- Q3. Define drought? State the factors lead to drought condition & mention drought prone areas.
- Q4. What do you mean by Flood? State two important factors which lead to Flood conditions and mention flood prone areas in India.

MATHEMATICS ----- CLASS XI

QUESTION BANK

1. SETS

Short Answer Type Questions

1. Write the following sets in the roaster form

(i) $A = \{x : x \in \mathbf{R}, 2x + 11 = 15\}$ (ii) $B = \{x \mid x^2 = x, x \in \mathbf{R}\}$

(iii) $C = \{x \mid x \text{ is a positive factor of a prime number } p\}$

2. Write the following sets in the roaster form :

(i) $D = \{t \mid t^3 = t, t \in \mathbf{R}\}$ (ii) $E = \{w \mid \frac{w-2}{w+3} = 3, w \in \mathbf{R}\}$

(iii) $F = \{x \mid x^4 - 5x^2 + 6 = 0, x \in \mathbf{R}\}$

3. If $Y = \{x \mid x \text{ is a positive factor of the number } 2^{p-1}(2^p - 1), \text{ where } 2^p - 1 \text{ is a prime number}\}$. Write Y in the roaster form.

4. State which of the following statements are true and which are false. Justify your answer

(i) $35 \in \{x \mid x \text{ has exactly four positive factors}\}$.

(ii) $128 \in \{y \mid \text{the sum of all the positive factors of } y \text{ is } 2y\}$

(iii) $3 \notin \{x \mid x^4 - 5x^3 + 2x^2 - 112x + 6 = 0\}$

(iv) $496 \notin \{y \mid \text{the sum of all the positive factors of } y \text{ is } 2y\}$.

5. Given $L = \{1, 2, 3, 4\}$, $M = \{3, 4, 5, 6\}$ and $N = \{1, 3, 5\}$

Verify that $L - (M \cup N) = (L - M) \cap (L - N)$

6. If A and B are subsets of the universal set U , then show that

(i) $A \subset A \cup B$

(ii) $A \subset B \Leftrightarrow A \cup B = B$

(iii) $(A \cap B) \subset A$

7. Given that $N = \{1, 2, 3, \dots, 100\}$. Then write

(i) the subset of N whose elements are even numbers.

(ii) the subset of N whose element are perfect square numbers.

8. If $X = \{1, 2, 3\}$, if n represents any member of X , write the following sets containing all numbers represented by

(i) $4n$

(ii) $n + 6$

(iii) $\frac{n}{2}$

(iv) $n - 1$

9. If $Y = \{1, 2, 3, \dots, 10\}$, and a represents any element of Y , write the following sets, containing all the elements satisfying the given conditions.

(i) $a \in Y$ but $a^2 \notin Y$

(ii) $a + 1 = 6, a \in Y$

(iii) a is less than 6 and $a \in Y$

10. A, B and C are subsets of Universal Set U. If $A = \{2, 4, 6, 8, 12, 20\}$
 $B = \{3, 6, 9, 12, 15\}$, $C = \{5, 10, 15, 20\}$ and U is the set of all whole numbers, draw a Venn diagram showing the relation of U, A, B and C.
11. Let U be the set of all boys and girls in a school, G be the set of all girls in the school, B be the set of all boys in the school, and S be the set of all students in the school who take swimming. Some, but not all, students in the school take swimming. Draw a Venn diagram showing one of the possible interrelationship among sets U, G, B and S.
12. For all sets A, B and C, show that $(A - B) \cap (C - B) = A - (B \cup C)$
 Determine whether each of the statement in Exercises 13 – 17 is true or false. Justify your answer.
13. For all sets A and B, $(A - B) \cup (A \cap B) = A$
14. For all sets A, B and C, $A - (B - C) = (A - B) - C$
15. For all sets A, B and C, if $A \subset B$, then $A \cap C \subset B \cap C$
16. For all sets A, B and C, if $A \subset B$, then $A \cup C \subset B \cup C$
17. For all sets A, B and C, if $A \subset C$ and $B \subset C$, then $A \cup B \subset C$.

Using properties of sets prove the statements given in Exercises 18 to 22

18. For all sets A and B, $A \cup (B - A) = A \cup B$
19. For all sets A and B, $A - (A - B) = A \cap B$
20. For all sets A and B, $A - (A \cap B) = A - B$
21. For all sets A and B, $(A \cup B) - B = A - B$
22. Let $T = \left\{ x \mid \frac{x+5}{x-7} - 5 = \frac{4x-40}{13-x} \right\}$. Is T an empty set? Justify your answer.

Long Answer Type Questions

23. Let A, B and C be sets. Then show that
 $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
24. Out of 100 students; 15 passed in English, 12 passed in Mathematics, 8 in Science, 6 in English and Mathematics, 7 in Mathematics and Science; 4 in English and Science; 4 in all the three. Find how many passed
 (i) in English and Mathematics but not in Science
 (ii) in Mathematics and Science but not in English
 (iii) in Mathematics only
 (iv) in more than one subject only
25. In a class of 60 students, 25 students play cricket and 20 students play tennis, and 10 students play both the games. Find the number of students who play neither?
26. In a survey of 200 students of a school, it was found that 120 study Mathematics, 90 study Physics and 70 study Chemistry, 40 study Mathematics and Physics, 30 study Physics and Chemistry, 50 study Chemistry and Mathematics and 20 none of these subjects. Find the number of students who study all the three subjects.

27. In a town of 10,000 families it was found that 40% families buy newspaper A, 20% families buy newspaper B, 10% families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three newspapers. Find
- The number of families which buy newspaper A only.
 - The number of families which buy none of A, B and C
28. In a group of 50 students, the number of students studying French, English, Sanskrit were found to be as follows:
 French = 17, English = 13, Sanskrit = 15
 French and English = 09, English and Sanskrit = 4
 French and Sanskrit = 5, English, French and Sanskrit = 3. Find the number of students who study
- French only
 - English only
 - Sanskrit only
 - English and Sanskrit but not French
 - French and Sanskrit but not English
 - French and English but not Sanskrit
 - at least one of the three languages
 - none of the three languages

Objective Type Questions

Choose the correct answers from the given four options in each Exercises 29 to 43 (M.C.Q.).

29. Suppose A_1, A_2, \dots, A_{30} are thirty sets each having 5 elements and B_1, B_2, \dots, B_n are n sets each with 3 elements, let $\bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^n B_j = S$ and each element of S belongs to exactly 10 of the A_i 's and exactly 9 of the B_j 's. then n is equal to
 (A) 15 (B) 3 (C) 45 (D) 35
30. Two finite sets have m and n elements. The number of subsets of the first set is 112 more than that of the second set. The values of m and n are, respectively,
 (A) 4, 7 (B) 7, 4 (C) 4, 4 (D) 7, 7
31. The set $(A \cap B)' \cup (B \cap C)$ is equal to
 (A) $A' \cup B \cup C$ (B) $A' \cup B$ (C) $A' \cup C'$ (D) $A' \cap B$
32. Let F_1 be the set of parallelograms, F_2 the set of rectangles, F_3 the set of rhombuses, F_4 the set of squares and F_5 the set of trapeziums in a plane. Then F_1 may be equal to
 (A) $F_2 \cap F_3$ (B) $F_3 \cap F_4$
 (C) $F_2 \cup F_5$ (D) $F_2 \cup F_3 \cup F_4 \cup F_5$
33. Let S = set of points inside the square, T = the set of points inside the triangle and C = the set of points inside the circle. If the triangle and circle intersect each other and are contained in a square. Then
 (A) $S \cap T \cap C = \phi$ (B) $S \cup T \cup C = C$
 (C) $S \cup T \cup C = S$ (D) $S \cup T = S \cap C$

34. Let R be set of points inside a rectangle of sides a and b ($a, b > 1$) with two sides along the positive direction of x -axis and y -axis. Then
- (A) $R = \{(x, y) : 0 \leq x \leq a, 0 \leq y \leq b\}$
 (B) $R = \{(x, y) : 0 \leq x < a, 0 \leq y \leq b\}$
 (C) $R = \{(x, y) : 0 \leq x \leq a, 0 < y < b\}$
 (D) $R = \{(x, y) : 0 < x < a, 0 < y < b\}$
35. In a class of 60 students, 25 students play cricket and 20 students play tennis, and 10 students play both the games. Then, the number of students who play neither is
- (A) 0 (B) 25 (C) 35 (D) 45
36. In a town of 840 persons, 450 persons read Hindi, 300 read English and 200 read both. Then the number of persons who read neither is
- (A) 210 (B) 290 (C) 180 (D) 260
37. If $X = \{8^n - 7n - 1 \mid n \in \mathbb{N}\}$ and $Y = \{49n - 49 \mid n \in \mathbb{N}\}$. Then
- (A) $X \subset Y$ (B) $Y \subset X$ (C) $X = Y$ (D) $X \cap Y = \phi$
38. A survey shows that 63% of the people watch a News Channel whereas 76% watch another channel. If $x\%$ of the people watch both channel, then
- (A) $x = 35$ (B) $x = 63$ (C) $39 \leq x \leq 63$ (D) $x = 39$
39. If sets A and B are defined as
- $$A = \{(x, y) \mid y = \frac{1}{x}, 0 \neq x \in \mathbb{R}\} \quad B = \{(x, y) \mid y = -x, x \in \mathbb{R}\}, \text{ then}$$
- (A) $A \cap B = A$ (B) $A \cap B = B$ (C) $A \cap B = \phi$ (D) $A \cup B = A$
40. If A and B are two sets, then $A \cap (A \cup B)$ equals
- (A) A (B) B (C) ϕ (D) $A \cap B$
41. If $A = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$ $B = \{2, 4, \dots, 18\}$ and N the set of natural numbers is the universal set, then $A' \cup (A \cup B) \cap B'$ is
- (A) ϕ (B) N (C) A (D) B
42. Let $S = \{x \mid x \text{ is a positive multiple of 3 less than 100}\}$
 $P = \{x \mid x \text{ is a prime number less than 20}\}$. Then $n(S) + n(P)$ is
- (A) 34 (B) 31 (C) 33 (D) 30
43. If X and Y are two sets and X' denotes the complement of X , then $X \cap (X \cup Y)'$ is equal to
- (A) X (B) Y (C) ϕ (D) $X \cap Y$

Fill In Blanks Type Questions

44. The set $\{x \in \mathbb{R} : 1 \leq x < 2\}$ can be written as _____.
45. When $A = \phi$, then number of elements in $P(A)$ is _____.
46. If A and B are finite sets such that $A \subset B$, then $n(A \cup B) =$ _____.
47. If A and B are any two sets, then $A - B$ is equal to _____.
48. Power set of the set $A = \{1, 2\}$ is _____.

49. Given the sets $A = \{1, 3, 5\}$, $B = \{2, 4, 6\}$ and $C = \{0, 2, 4, 6, 8\}$. Then the universal set of all the three sets A, B and C can be _____.
50. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 2, 3, 5\}$, $B = \{2, 4, 6, 7\}$ and $C = \{2, 3, 4, 8\}$. Then
- (i) $(B \cup C)'$ is _____. (ii) $(C - A)'$ is _____.
51. For all sets A and B, $A - (A \cap B)$ is equal to _____.

Match Type Questions

52. Match the following sets for all sets A, B and C

- | | |
|-----------------------------|--------------------------------------|
| (i) $((A' \cup B') - A)'$ | (a) $A - B$ |
| (ii) $[B' \cup (B' - A)]'$ | (b) A |
| (iii) $(A - B) - (B - C)$ | (c) B |
| (iv) $(A - B) \cap (C - B)$ | (d) $(A \times B) \cap (A \times C)$ |
| (v) $A \times (B \cap C)$ | (e) $(A \times B) \cup (A \times C)$ |
| (vi) $A \times (B \cup C)$ | (f) $(A \cap C) - B$ |

True or False Statements Type Questions

53. If A is any set, then $A \subset A$
54. Given that $M = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ and if $B = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, then $B \subset M$
55. The sets $\{1, 2, 3, 4\}$ and $\{3, 4, 5, 6\}$ are equal.
56. $Q \cup Z = Q$, where Q is the set of rational numbers and Z is the set of integers.
57. Let sets R and T be defined as
- $R = \{x \in \mathbf{Z} \mid x \text{ is divisible by } 2\}$
- $T = \{x \in \mathbf{Z} \mid x \text{ is divisible by } 6\}$. Then $T \subset R$
58. Given $A = \{0, 1, 2\}$, $B = \{x \in \mathbf{R} \mid 0 \leq x \leq 2\}$. Then $A = B$.

Answers to Objective Type Questions

29. C	30. B	31. B	32. D
33. C	34. D	35. B	36. B
37. C	38. C	39. C	40. A
41. B	42. B	43. C	

2. RELATION AND FUNCTIONS

Short Answer Type Questions:

1. Let $A = \{-1, 2, 3\}$ and $B = \{1, 3\}$. Determine
 - (i) $A \times B$
 - (ii) $B \times A$
 - (iii) $B \times B$
 - (iv) $A \times A$
2. If $P = \{x : x < 3, x \in \mathbb{N}\}$, $Q = \{x : x \leq 2, x \in \mathbb{W}\}$. Find $(P \cup Q) \times (P \cap Q)$, where \mathbb{W} is the set of whole numbers.
3. If $A = \{x : x \in \mathbb{W}, x < 2\}$ $B = \{x : x \in \mathbb{N}, 1 < x < 5\}$ $C = \{3, 5\}$ find
 - (i) $A \times (B \cap C)$
 - (ii) $A \times (B \cup C)$
4. In each of the following cases, find a and b .
 - (i) $(2a + b, a - b) = (8, 3)$
 - (ii) $\left(\frac{a}{4}, a - 2b\right) = (0, 6 + b)$
5. Given $A = \{1, 2, 3, 4, 5\}$, $S = \{(x, y) : x \in A, y \in A\}$. Find the ordered pairs which satisfy the conditions given below:
 - (i) $x + y = 5$
 - (ii) $x + y < 5$
 - (iii) $x + y > 8$
6. Given $R = \{(x, y) : x, y \in \mathbb{W}, x^2 + y^2 = 25\}$. Find the domain and Range of R .
7. If $R_1 = \{(x, y) \mid y = 2x + 7, \text{ where } x \in \mathbb{R} \text{ and } -5 \leq x \leq 5\}$ is a relation. Then find the domain and Range of R_1 .
8. If $R_2 = \{(x, y) \mid x \text{ and } y \text{ are integers and } x^2 + y^2 = 64\}$ is a relation. Then find R_2 .
9. If $R_3 = \{(x, |x|) \mid x \text{ is a real number}\}$ is a relation. Then find domain and range of R_3 .
10. Is the given relation a function? Give reasons for your answer.
 - (i) $h = \{(4, 6), (3, 9), (-11, 6), (3, 11)\}$
 - (ii) $f = \{(x, x) \mid x \text{ is a real number}\}$
 - (iii) $g = \left\{ \left(n, \frac{1}{n} \right) \mid n \text{ is a positive integer} \right\}$
 - (iv) $s = \{(n, n^2) \mid n \text{ is a positive integer}\}$
 - (v) $t = \{(x, 3) \mid x \text{ is a real number}\}$

19. Redefine the function $f(x) = |x-2| + |2+x|$, $-3 \leq x \leq 3$

20. If $f(x) = \frac{x-1}{x+1}$, then show that

(i) $f\left(\frac{1}{x}\right) = -f(x)$

(ii) $f\left(-\frac{1}{x}\right) = \frac{-1}{f(x)}$

21. Let $f(x) = \sqrt{x}$ and $g(x) = x$ be two functions defined in the domain $\mathbb{R}^+ \cup \{0\}$.

Find

(i) $(f+g)(x)$

(ii) $(f-g)(x)$

(iii) $(fg)(x)$

(iv) $\left(\frac{f}{g}\right)(x)$

22. Find the domain and Range of the function $f(x) = \frac{1}{\sqrt{x-5}}$.

23. If $f(x) = y = \frac{ax-b}{cx-a}$, then prove that $f(y) = x$.

Objective Type Questions:

Choose the correct answers in Exercises from 24 to 35 (M.C.Q.)

24. Let $n(A) = m$, and $n(B) = n$. Then the total number of non-empty relations that can be defined from A to B is

(A) m^n

(B) $n^m - 1$

(C) $mn - 1$

(D) $2^{mn} - 1$

25. If $[x]^2 - 5[x] + 6 = 0$, where $[\cdot]$ denote the greatest integer function, then

(A) $x \in [3, 4]$

(B) $x \in (2, 3]$

(C) $x \in [2, 3]$

(D) $x \in [2, 4]$

26. Range of $f(x) = \frac{1}{1-2\cos x}$ is

(A) $\left[\frac{1}{3}, 1\right]$

(B) $\left[-1, \frac{1}{3}\right]$

(C) $(-\infty, -1] \cup \left[\frac{1}{3}, \infty\right)$

(D) $\left[-\frac{1}{3}, 1\right]$

27. Let $f(x) = \sqrt{1+x^2}$, then

(A) $f(xy) = f(x) \cdot f(y)$

(B) $f(xy) \geq f(x) \cdot f(y)$

(C) $f(xy) \leq f(x) \cdot f(y)$

(D) None of these

[Hint : find $f(xy) = \sqrt{1+x^2y^2}$, $f(x) \cdot f(y) = \sqrt{1+x^2y^2+x^2+y^2}$]

28. Domain of $\sqrt{a^2-x^2}$ ($a > 0$) is

(A) $(-a, a)$

(B) $[-a, a]$

(C) $[0, a]$

(D) $(-a, 0]$

29. If $f(x) = ax + b$, where a and b are integers, $f(-1) = -5$ and $f(3) = 3$, then a and b are equal to

(A) $a = -3, b = -1$

(B) $a = 2, b = -3$

(C) $a = 0, b = 2$

(D) $a = 2, b = 3$

30. The domain of the function f defined by $f(x) = \sqrt{4-x} + \frac{1}{\sqrt{x^2-1}}$ is equal to
- (A) $(-\infty, -1) \cup (1, 4]$ (B) $(-\infty, -1] \cup (1, 4]$
 (C) $(-\infty, -1) \cup [1, 4]$ (D) $(-\infty, -1) \cup [1, 4)$
31. The domain and range of the real function f defined by $f(x) = \frac{4-x}{x-4}$ is given by
- (A) Domain = \mathbf{R} , Range = $\{-1, 1\}$
 (B) Domain = $\mathbf{R} - \{1\}$, Range = \mathbf{R}
 (C) Domain = $\mathbf{R} - \{4\}$, Range = $\{-1\}$
 (D) Domain = $\mathbf{R} - \{-4\}$, Range = $\{-1, 1\}$
32. The domain and range of real function f defined by $f(x) = \sqrt{x-1}$ is given by
- (A) Domain = $(1, \infty)$, Range = $(0, \infty)$
 (B) Domain = $[1, \infty)$, Range = $(0, \infty)$
 (C) Domain = $[1, \infty)$, Range = $[0, \infty)$
 (D) Domain = $[1, \infty)$, Range = $[0, \infty)$
33. The domain of the function f given by $f(x) = \frac{x^2+2x+1}{x^2-x-6}$
- (A) $\mathbf{R} - \{3, -2\}$ (B) $\mathbf{R} - \{-3, 2\}$
 (C) $\mathbf{R} - [3, -2]$ (D) $\mathbf{R} - (3, -2)$
34. The domain and range of the function f given by $f(x) = 2 - |x-5|$ is
- (A) Domain = \mathbf{R}^+ , Range = $(-\infty, 1]$
 (B) Domain = \mathbf{R} , Range = $(-\infty, 2]$
 (C) Domain = \mathbf{R} , Range = $(-\infty, 2)$
 (D) Domain = \mathbf{R}^+ , Range = $(-\infty, 2]$
35. The domain for which the functions defined by $f(x) = 3x^2 - 1$ and $g(x) = 3 + x$ are equal is
- (A) $\left\{-1, \frac{4}{3}\right\}$ (B) $\left[-1, \frac{4}{3}\right]$
 (C) $\left(-1, \frac{4}{3}\right)$ (D) $\left[-1, \frac{4}{3}\right)$

Fill In Blanks Type Questions

36. Let f and g be two real functions given by
 $f = \{(0, 1), (2, 0), (3, -4), (4, 2), (5, 1)\}$
 $g = \{(1, 0), (2, 2), (3, -1), (4, 4), (5, 3)\}$
 then the domain of $f \cdot g$ is given by _____.

Match Type Questions

37. Let $f = \{(2, 4), (5, 6), (8, -1), (10, -3)\}$

$g = \{(2, 5), (7, 1), (8, 4), (10, 13), (11, 5)\}$

be two real functions. Then Match the following :

- | | |
|-------------------|--|
| (a) $f - g$ | (i) $\left\{\left(2, \frac{4}{5}\right), \left(8, \frac{-1}{4}\right), \left(10, \frac{-3}{13}\right)\right\}$ |
| (b) $f + g$ | (ii) $\{(2, 20), (8, -4), (10, -39)\}$ |
| (c) $f \cdot g$ | (iii) $\{(2, -1), (8, -5), (10, -16)\}$ |
| (d) $\frac{f}{g}$ | (iv) $\{(2, 9), (8, 3), (10, 10)\}$ |

True or False Statements Type Questions

38. The ordered pair $(5, 2)$ belongs to the relation $R = \{(x, y) : y = x - 5, x, y \in \mathbf{Z}\}$

39. If $P = \{1, 2\}$, then $P \times P \times P = \{(1, 1, 1), (2, 2, 2), (1, 2, 2), (2, 1, 1)\}$

40. If $A = \{1, 2, 3\}$, $B = \{3, 4\}$ and $C = \{4, 5, 6\}$, then $(A \times B) \cup (A \times C) = \{(1, 3), (1, 4), (1, 5), (1, 6), (2, 3), (2, 4), (2, 5), (2, 6), (3, 3), (3, 4), (3, 5), (3, 6)\}$.

41. If $(x - 2, y + 5) = \left(-2, \frac{1}{3}\right)$ are two equal ordered pairs, then $x = 4, y = \frac{-14}{3}$

42. If $A \times B = \{(a, x), (a, y), (b, x), (b, y)\}$, then $A = \{a, b\}, B = \{x, y\}$

Answers to Objective Type Questions

24. D

25. D

26. B

27. C

28. B

29. B

30. A

31. C

32. C

33. A

34. B

35. A

3. TRIGONOMETRY

Short Answer Type Questions

1. Prove that $\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$
2. If $\frac{2 \sin \alpha}{1 + \cos \alpha + \sin \alpha} = y$, then prove that $\frac{1 - \cos \alpha + \sin \alpha}{1 + \sin \alpha}$ is also equal to y .

$$\left[\text{Hint: Express } \frac{1 - \cos \alpha + \sin \alpha}{1 + \sin \alpha} = \frac{1 - \cos \alpha + \sin \alpha}{1 + \sin \alpha} \cdot \frac{1 + \cos \alpha + \sin \alpha}{1 + \cos \alpha + \sin \alpha} \right]$$

3. If $m \sin \theta = n \sin (\theta + 2\alpha)$, then prove that $\tan (\theta + \alpha) \cot \alpha = \frac{m+n}{m-n}$

$$[\text{Hint: Express } \frac{\sin (\theta + 2\alpha)}{\sin \theta} = \frac{m}{n} \text{ and apply componendo and dividendo}]$$

4. If $\cos (\alpha + \beta) = \frac{4}{5}$ and $\sin (\alpha - \beta) = \frac{5}{13}$, where α lie between 0 and $\frac{\pi}{4}$, find the value of $\tan 2\alpha$ [Hint: Express $\tan 2\alpha$ as $\tan (\alpha + \beta + \alpha - \beta)$]

5. If $\tan x = \frac{b}{a}$, then find the value of $\sqrt{\frac{a+b}{a-b}} + \sqrt{\frac{a-b}{a+b}}$

6. Prove that $\cos \theta \cos \frac{\theta}{2} - \cos 3\theta \cos \frac{9\theta}{2} = \sin 7\theta \sin 8\theta$.

$$[\text{Hint: Express L.H.S.} = \frac{1}{2} [2 \cos \theta \cos \frac{\theta}{2} - 2 \cos 3\theta \cos \frac{9\theta}{2}]]$$

7. If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$, then show that $a^2 + b^2 = m^2 + n^2$
8. Find the value of $\tan 22^\circ 30'$.

$$[\text{Hint: Let } \theta = 45^\circ, \text{ use } \tan \frac{\theta}{2} = \frac{\sin \frac{\theta}{2}}{\cos \frac{\theta}{2}} = \frac{2 \sin \frac{\theta}{2} \cos \frac{\theta}{2}}{2 \cos^2 \frac{\theta}{2}} = \frac{\sin \theta}{1 + \cos \theta}]$$

9. Prove that $\sin 4A = 4 \sin A \cos^3 A - 4 \cos A \sin^3 A$.
10. If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, then prove that $m^2 - n^2 = 4 \sin \theta \tan \theta$
[Hint: $m + n = 2 \tan \theta$, $m - n = 2 \sin \theta$, then use $m^2 - n^2 = (m + n)(m - n)$]

11. If $\tan (A + B) = p$, $\tan (A - B) = q$, then show that $\tan 2A = \frac{p+q}{1-pq}$

$$[\text{Hint: Use } 2A = (A + B) + (A - B)]$$

12. If $\cos \alpha + \cos \beta = 0 = \sin \alpha + \sin \beta$, then prove that $\cos 2\alpha + \cos 2\beta = -2 \cos (\alpha + \beta)$.
[Hint: $(\cos \alpha + \cos \beta)^2 - (\sin \alpha + \sin \beta)^2 = 0$]

13. If $\frac{\sin (x+y)}{\sin (x-y)} = \frac{a+b}{a-b}$, then show that $\frac{\tan x}{\tan y} = \frac{a}{b}$ [Hint: Use Componendo and Dividendo].

14. If $\tan \theta = \frac{\sin \alpha - \cos \alpha}{\sin \alpha + \cos \alpha}$, then show that $\sin \alpha + \cos \alpha = \sqrt{2} \cos \theta$.

$$[\text{Hint: Express } \tan \theta = \tan \left(\alpha - \frac{\pi}{4} \right) \Rightarrow \theta = \alpha - \frac{\pi}{4}]$$

15. If $\sin\theta + \cos\theta = 1$, then find the general value of θ .
16. Find the most general value of θ satisfying the equation $\tan\theta = -1$ and $\cos\theta = \frac{1}{\sqrt{2}}$.
17. If $\cot\theta + \tan\theta = 2 \operatorname{cosec}\theta$, then find the general value of θ .
18. If $2\sin^2\theta = 3\cos\theta$, where $0 \leq \theta \leq 2\pi$, then find the value of θ .
19. If $\sec x \cos 5x + 1 = 0$, where $0 < x \leq \frac{\pi}{2}$, then find the value of x .

Long Answer Type Questions

20. If $\sin(\theta + \alpha) = a$ and $\sin(\theta + \beta) = b$, then prove that $\cos 2(\alpha - \beta) - 4ab \cos(\alpha - \beta) = 1 - 2a^2 - 2b^2$ [Hint: Express $\cos(\alpha - \beta) = \cos((\theta + \alpha) - (\theta + \beta))$]

21. If $\cos(\theta + \phi) = m \cos(\theta - \phi)$, then prove that $\tan\theta = \frac{1-m}{1+m} \cot\phi$.

[Hint: Express $\frac{\cos(\theta + \phi)}{\cos(\theta - \phi)} = \frac{m}{1}$ and apply Componendo and Dividendo]

22. Find the value of the expression

$$3 \left[\sin^4 \left(\frac{3\pi}{2} - \alpha \right) + \sin^4(3\pi + \alpha) \right] - 2 \left\{ \sin^6 \left(\frac{\pi}{2} + \alpha \right) + \sin^6(5\pi - \alpha) \right\}$$

23. If $a \cos 2\theta + b \sin 2\theta = c$ has α and β as its roots, then prove that

$$\tan\alpha + \tan\beta = \frac{2b}{a+c}$$

[Hint: Use the identities $\cos 2\theta = \frac{1 - \tan^2\theta}{1 + \tan^2\theta}$ and $\sin 2\theta = \frac{2 \tan\theta}{1 + \tan^2\theta}$].

24. If $x = \sec\phi - \tan\phi$ and $y = \operatorname{cosec}\phi + \cot\phi$ then show that $xy + x - y + 1 = 0$ [Hint: Find $xy + 1$ and then show that $x - y = -(xy + 1)$]

25. If θ lies in the first quadrant and $\cos\theta = \frac{8}{17}$, then find the value of $\cos(30^\circ + \theta) + \cos(45^\circ - \theta) + \cos(120^\circ - \theta)$.

26. Find the value of the expression $\cos^4 \frac{\pi}{8} + \cos^4 \frac{3\pi}{8} + \cos^4 \frac{5\pi}{8} + \cos^4 \frac{7\pi}{8}$

[Hint: Simplify the expression to $2 \left(\cos^4 \frac{\pi}{8} + \cos^4 \frac{3\pi}{8} \right)$

$$= 2 \left[\left(\cos^2 \frac{\pi}{8} + \cos^2 \frac{3\pi}{8} \right)^2 - 2 \cos^2 \frac{\pi}{8} \cos^2 \frac{3\pi}{8} \right]$$

27. Find the general solution of the equation $5\cos^2\theta + 7\sin^2\theta - 6 = 0$

28. Find the general solution of the equation $\sin x - 3\sin 2x + \sin 3x = \cos x - 3\cos 2x + \cos 3x$

29. Find the general solution of the equation $(\sqrt{3} - 1) \cos\theta + (\sqrt{3} + 1) \sin\theta = 2$

[Hint: Put $\sqrt{3} - 1 = r \sin\alpha$, $\sqrt{3} + 1 = r \cos\alpha$ which gives $\tan\alpha = \tan\left(\frac{\pi}{4} - \frac{\pi}{6}\right)$

$$\Rightarrow \alpha = \frac{\pi}{12}]$$

Objective Type Questions

Choose the correct answer from the given four options in the Exercises 30 to 59 (M.C.Q.).

30. If $\sin \theta + \operatorname{cosec} \theta = 2$, then $\sin^2 \theta + \operatorname{cosec}^2 \theta$ is equal to
(A) 1 (B) 4
(C) 2 (D) None of these
31. If $f(x) = \cos^2 x + \sec^2 x$, then
(A) $f(x) < 1$ (B) $f(x) = 1$
(C) $2 < f(x) < 1$ (D) $f(x) \geq 2$
[Hint: A.M \geq G.M.]
32. If $\tan \theta = \frac{1}{2}$ and $\tan \phi = \frac{1}{3}$, then the value of $\theta + \phi$ is
(A) $\frac{\pi}{6}$ (B) π (C) 0 (D) $\frac{\pi}{4}$
33. Which of the following is not correct?
(A) $\sin \theta = -\frac{1}{5}$ (B) $\cos \theta = 1$
(C) $\sec \theta = \frac{1}{2}$ (D) $\tan \theta = 20$
34. The value of $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$ is
(A) 0 (B) 1
(C) $\frac{1}{2}$ (D) Not defined
35. The value of $\frac{1 - \tan^2 15^\circ}{1 + \tan^2 15^\circ}$ is
(A) 1 (B) $\sqrt{3}$ (C) $\frac{\sqrt{3}}{2}$ (D) 2
36. The value of $\cos 1^\circ \cos 2^\circ \cos 3^\circ \dots \cos 179^\circ$ is
(A) $\frac{1}{\sqrt{2}}$ (B) 0 (C) 1 (D) -1
37. If $\tan \theta = 3$ and θ lies in third quadrant, then the value of $\sin \theta$ is
(A) $\frac{1}{\sqrt{10}}$ (B) $-\frac{1}{\sqrt{10}}$ (C) $\frac{-3}{\sqrt{10}}$ (D) $\frac{3}{\sqrt{10}}$
38. The value of $\tan 75^\circ - \cot 75^\circ$ is equal to
(A) $2\sqrt{3}$ (B) $2 + \sqrt{3}$ (C) $2 - \sqrt{3}$ (D) 1
39. Which of the following is correct?
(A) $\sin 1^\circ > \sin 1$ (B) $\sin 1^\circ < \sin 1$
(C) $\sin 1^\circ = \sin 1$ (D) $\sin 1^\circ = \frac{\pi}{18^\circ} \sin 1$

[Hint: 1 radian = $\frac{180^\circ}{\pi} = 57^\circ 30'$ approx]

40. If $\tan \alpha = \frac{m}{m+1}$, $\tan \beta = \frac{1}{2m+1}$, then $\alpha + \beta$ is equal to
(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{3}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{4}$

41. The minimum value of $3 \cos x + 4 \sin x + 8$ is
 (A) 5 (B) 9 (C) 7 (D) 3
42. The value of $\tan 3A - \tan 2A - \tan A$ is equal to
 (A) $\tan 3A \tan 2A \tan A$
 (B) $-\tan 3A \tan 2A \tan A$
 (C) $\tan A \tan 2A - \tan 2A \tan 3A - \tan 3A \tan A$
 (D) None of these
43. The value of $\sin (45^\circ + \theta) - \cos (45^\circ - \theta)$ is
 (A) $2 \cos \theta$ (B) $2 \sin \theta$ (C) 1 (D) 0
44. The value of $\cot\left(\frac{\pi}{4} + \theta\right) \cot\left(\frac{\pi}{4} - \theta\right)$ is
 (A) -1 (B) 0 (C) 1 (D) Not defined
45. $\cos 2\theta \cos 2\phi + \sin^2(\theta - \phi) - \sin^2(\theta + \phi)$ is equal to
 (A) $\sin 2(\theta + \phi)$ (B) $\cos 2(\theta + \phi)$
 (C) $\sin 2(\theta - \phi)$ (D) $\cos 2(\theta - \phi)$
 [Hint: Use $\sin^2 A - \sin^2 B = \sin(A + B) \sin(A - B)$]
46. The value of $\cos 12^\circ + \cos 84^\circ + \cos 156^\circ + \cos 132^\circ$ is
 (A) $\frac{1}{2}$ (B) 1 (C) $-\frac{1}{2}$ (D) $\frac{1}{8}$
47. If $\tan A = \frac{1}{2}$, $\tan B = \frac{1}{3}$, then $\tan(2A + B)$ is equal to
 (A) 1 (B) 2 (C) 3 (D) 4
48. The value of $\sin \frac{\pi}{10} \sin \frac{13\pi}{10}$ is
 (A) $\frac{1}{2}$ (B) $-\frac{1}{2}$ (C) $-\frac{1}{4}$ (D) 1
 [Hint: Use $\sin 18^\circ = \frac{\sqrt{5}-1}{4}$ and $\cos 36^\circ = \frac{\sqrt{5}+1}{4}$]
49. The value of $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ$ is equal to
 (A) 1 (B) 0 (C) $\frac{1}{2}$ (D) 2
50. If $\sin \theta + \cos \theta = 1$, then the value of $\sin 2\theta$ is equal to
 (A) 1 (B) $\frac{1}{2}$ (C) 0 (D) -1

51. If $\alpha + \beta = \frac{\pi}{4}$, then the value of $(1 + \tan \alpha)(1 + \tan \beta)$ is
 (A) 1 (B) 2
 (C) -2 (D) Not defined
52. If $\sin \theta = \frac{-4}{5}$ and θ lies in third quadrant then the value of $\cos \frac{\theta}{2}$ is
 (A) $\frac{1}{5}$ (B) $-\frac{1}{\sqrt{10}}$ (C) $-\frac{1}{\sqrt{5}}$ (D) $\frac{1}{\sqrt{10}}$
53. Number of solutions of the equation $\tan x + \sec x = 2 \cos x$ lying in the interval $[0, 2\pi]$ is
 (A) 0 (B) 1 (C) 2 (D) 3
54. The value of $\sin \frac{\pi}{18} + \sin \frac{\pi}{9} + \sin \frac{2\pi}{9} + \sin \frac{5\pi}{18}$ is given by
 (A) $\sin \frac{7\pi}{18} + \sin \frac{4\pi}{9}$ (B) 1
 (C) $\cos \frac{\pi}{6} + \cos \frac{3\pi}{7}$ (D) $\cos \frac{\pi}{9} + \sin \frac{\pi}{9}$
55. If A lies in the second quadrant and $3 \tan A + 4 = 0$, then the value of $2 \cot A - 5 \cos A + \sin A$ is equal to
 (A) $\frac{-53}{10}$ (B) $\frac{23}{10}$ (C) $\frac{37}{10}$ (D) $\frac{7}{10}$
56. The value of $\cos^2 48^\circ - \sin^2 12^\circ$ is
 (A) $\frac{\sqrt{5}+1}{8}$ (B) $\frac{\sqrt{5}-1}{8}$
 (C) $\frac{\sqrt{5}+1}{5}$ (D) $\frac{\sqrt{5}+1}{2\sqrt{2}}$
 [Hint: Use $\cos^2 A - \sin^2 B = \cos(A+B)\cos(A-B)$]
57. If $\tan \alpha = \frac{1}{7}$, $\tan \beta = \frac{1}{3}$, then $\cos 2\alpha$ is equal to
 (A) $\sin 2\beta$ (B) $\sin 4\beta$ (C) $\sin 3\beta$ (D) $\cos 2\beta$
58. If $\tan \theta = \frac{a}{b}$, then $b \cos 2\theta + a \sin 2\theta$ is equal to
 (A) a (B) b (C) $\frac{a}{b}$ (D) None
59. If for real values of x, $\cos \theta = x + \frac{1}{x}$, then
 (A) θ is an acute angle (B) θ is right angle
 (C) θ is an obtuse angle (D) No value of θ is possible

Fill In Blanks Type Questions

60. The value of $\frac{\sin 50^\circ}{\sin 130^\circ}$ is _____.
61. If $k = \sin\left(\frac{\pi}{18}\right) \sin\left(\frac{5\pi}{18}\right) \sin\left(\frac{7\pi}{18}\right)$, then the numerical value of k is _____.
62. If $\tan A = \frac{1 - \cos B}{\sin B}$, then $\tan 2A =$ _____.
63. If $\sin x + \cos x = a$, then
(i) $\sin^6 x + \cos^6 x =$ _____
(ii) $|\sin x - \cos x| =$ _____.
64. In a triangle ABC with $\angle C = 90^\circ$ the equation whose roots are $\tan A$ and $\tan B$ is _____.
[Hint: $A + B = 90^\circ \Rightarrow \tan A \tan B = 1$ and $\tan A + \tan B = \frac{2}{\sin 2A}$]
65. $3(\sin x - \cos x)^4 + 6(\sin x + \cos x)^2 + 4(\sin^6 x + \cos^6 x) =$ _____.
66. Given $x > 0$, the values of $f(x) = -3 \cos \sqrt{3+x+x^2}$ lie in the interval _____.
67. The maximum distance of a point on the graph of the function $y = \sqrt{3} \sin x + \cos x$ from x -axis is _____.

True or False Statements Type Questions

68. If $\tan A = \frac{1 - \cos B}{\sin B}$, then $\tan 2A = \tan B$
69. The equality $\sin A + \sin 2A + \sin 3A = 3$ holds for some real value of A .
70. $\sin 10^\circ$ is greater than $\cos 10^\circ$.
71. $\cos \frac{2\pi}{15} \cos \frac{4\pi}{15} \cos \frac{8\pi}{15} \cos \frac{16\pi}{15} = \frac{1}{16}$
72. One value of θ which satisfies the equation $\sin^4 \theta - 2\sin^2 \theta - 1$ lies between 0 and 2π .
73. If $\operatorname{cosec} x = 1 + \cot x$ then $x = 2n\pi, 2n\pi + \frac{\pi}{2}$
74. If $\tan \theta + \tan 2\theta + \sqrt{3} \tan \theta \tan 2\theta = \sqrt{3}$, then $\theta = \frac{n\pi}{3} + \frac{\pi}{9}$
75. If $\tan(\pi \cos \theta) = \cot(\pi \sin \theta)$, then $\cos\left(\theta - \frac{\pi}{4}\right) = \pm \frac{1}{2\sqrt{2}}$

Match Type Questions

76. In the following match each item given under the column C_1 to its correct answer given under the column C_2 :

(a) $\sin(x+y) \sin(x-y)$

(i) $\cos^2 x - \sin^2 y$

(b) $\cos(x+y) \cos(x-y)$

(ii) $\frac{1 - \tan \theta}{1 + \tan \theta}$

(c) $\cot\left(\frac{\pi}{4} + \theta\right)$

(iii) $\frac{1 + \tan \theta}{1 - \tan \theta}$

(d) $\tan\left(\frac{\pi}{4} + \theta\right)$

(iv) $\sin^2 x - \sin^2 y$

Answers to Objective Type Questions

30. C

31. D

32. D

33. C

34. B

35. C

36. B

37. C

38. A

39. B

40. D

41. D

42. A

43. D

44. C

45. B

46. C

47. C

48. C

49. B

50. C

51. B

52. C

53. C

54. A

55. B

56. A

57. B

58. B

59. D

4. PERMUTATION AND COMBINATION

Short Type Questions

1. Eight chairs are numbered 1 to 8. Two women and 3 men wish to occupy one chair each. First the women choose the chairs from amongst the chairs 1 to 4 and then men select from the remaining chairs. Find the total number of possible arrangements.

[Hint: 2 women occupy the chair, from 1 to 4 in 4P_2 ways and 3 men occupy the remaining chairs in 6P_3 ways.]

2. If the letters of the word RACHIT are arranged in all possible ways as listed in dictionary. Then what is the rank of the word RACHIT ?

[Hint: In each case number of words beginning with A, C, H, I is 5!]

3. A candidate is required to answer 7 questions out of 12 questions, which are divided into two groups, each containing 6 questions. He is not permitted to attempt more than 5 questions from either group. Find the number of different ways of doing questions.

4. Out of 18 points in a plane, no three are in the same line except five points which are collinear. Find the number of lines that can be formed joining the point.

[Hint: Number of straight lines = ${}^{18}C_2 - {}^5C_2 + 1$.]

5. We wish to select 6 persons from 8, but if the person A is chosen, then B must be chosen. In how many ways can selections be made?
6. How many committee of five persons with a chairperson can be selected from 12 persons.
[Hint: Chairman can be selected in 12 ways and remaining in ${}^{11}C_4$.]
7. How many automobile license plates can be made if each plate contains two different letters followed by three different digits?
8. A bag contains 5 black and 6 red balls. Determine the number of ways in which 2 black and 3 red balls can be selected from the lot.
9. Find the number of permutations of n distinct things taken r together, in which 3 particular things must occur together.
10. Find the number of different words that can be formed from the letters of the word 'TRIANGLE' so that no vowels are together.
11. Find the number of positive integers greater than 6000 and less than 7000 which are divisible by 5, provided that no digit is to be repeated.
12. There are 10 persons named $P_1, P_2, P_3, \dots, P_{10}$. Out of 10 persons, 5 persons are to be arranged in a line such that in each arrangement P_1 must occur whereas P_4 and P_5 do not occur. Find the number of such possible arrangements.
[Hint: Required number of arrangement = ${}^7C_4 \times 5!$]
13. There are 10 lamps in a hall. Each one of them can be switched on independently. Find the number of ways in which the hall can be illuminated.
[Hint: Required number = $2^{10} - 1$.]
14. A box contains two white, three black and four red balls. In how many ways can three balls be drawn from the box, if atleast one black ball is to be included in the draw.
[Hint: Required number of ways = ${}^3C_1 \times {}^6C_2 + {}^3C_2 \times {}^6C_1 + {}^3C_3$.]
15. If ${}^nC_{r-1} = 36$, ${}^nC_r = 84$ and ${}^nC_{r+1} = 126$, then find rC_2 .
[Hint: Form equation using $\frac{{}^nC_r}{{}^nC_{r-1}}$ and $\frac{{}^nC_r}{{}^nC_{r+1}}$ to find the value of r .]
16. Find the number of integers greater than 7000 that can be formed with the digits 3, 5, 7, 8 and 9 where no digits are repeated.
[Hint: Besides 4 digit integers greater than 7000, five digit integers are always greater than 7000.]
17. If 20 lines are drawn in a plane such that no two of them are parallel and no three are concurrent, in how many points will they intersect each other?
18. In a certain city, all telephone numbers have six digits, the first two digits always being 41 or 42 or 46 or 62 or 64. How many telephone numbers have all six digits distinct?
19. In an examination, a student has to answer 4 questions out of 5 questions; questions 1 and 2 are however compulsory. Determine the number of ways in which the student can make the choice.
20. A convex polygon has 44 diagonals. Find the number of its sides.
[Hint: Polygon of n sides has $({}^nC_2 - n)$ number of diagonals.]

31. A five digit number divisible by 3 is to be formed using the numbers 0, 1, 2, 3, 4 and 5 without repetitions. The total number of ways this can be done is
 (A) 216 (B) 600 (C) 240 (D) 3125
 [Hint: 5 digit numbers can be formed using digits 0, 1, 2, 4, 5 or by using digits 1, 2, 3, 4, 5 since sum of digits in these cases is divisible by 3.]
32. Every body in a room shakes hands with everybody else. The total number of hand shakes is 66. The total number of persons in the room is
 (A) 11 (B) 12 (C) 13 (D) 14
33. The number of triangles that are formed by choosing the vertices from a set of 12 points, seven of which lie on the same line is
 (A) 105 (B) 15 (C) 175 (D) 185
34. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines is
 (A) 6 (B) 18 (C) 12 (D) 9
35. The number of ways in which a team of eleven players can be selected from 22 players always including 2 of them and excluding 4 of them is
 (A) ${}^{16}C_{11}$ (B) ${}^{16}C_5$ (C) ${}^{16}C_9$ (D) ${}^{20}C_9$
36. The number of 5-digit telephone numbers having atleast one of their digits repeated is
 (A) 90,000 (B) 10,000 (C) 30,240 (D) 69,760
37. The number of ways in which we can choose a committee from four men and six women so that the committee includes at least two men and exactly twice as many women as men is
 (A) 94 (B) 126 (C) 128 (D) None
38. The total number of 9 digit numbers which have all different digits is
 (A) 10! (B) 9! (C) $9 \times 9!$ (D) $10 \times 10!$
39. The number of words which can be formed out of the letters of the word ARTICLE, so that vowels occupy the even place is
 (A) 1440 (B) 144
 (C) 7! (D) ${}^4C_4 \times {}^3C_3$
40. Given 5 different green dyes, four different blue dyes and three different red dyes, the number of combinations of dyes which can be chosen taking at least one green and one blue dye is
 (A) 3600 (B) 3720 (C) 3800 (D) 3600
 [Hint: Possible numbers of choosing or not choosing 5 green dyes, 4 blue dyes and 3 red dyes are 2^5 , 2^4 and 2^3 , respectively.]

Fill in the Blanks Type Questions

41. If ${}^n P_r = 840$, ${}^n C_r = 35$, then $r =$ _____.
42. ${}^{15} C_8 + {}^{15} C_9 - {}^{15} C_6 - {}^{15} C_7 =$ _____.
43. The number of permutations of n different objects, taken r at a time, when repetitions are allowed, is _____.
44. The number of different words that can be formed from the letters of the word INTERMEDIATE such that two vowels never come together is _____.

[Hint: Number of ways of arranging 6 consonants of which two are alike is $\frac{6!}{2!}$

and number of ways of arranging vowels = ${}^7 P_6 \times \frac{1}{3!} \times \frac{1}{2!}$.]

45. Three balls are drawn from a bag containing 5 red, 4 white and 3 black balls. The number of ways in which this can be done if at least 2 are red is _____.
46. The number of six-digit numbers, all digits of which are odd is _____.
47. In a football championship, 153 matches were played. Every two teams played one match with each other. The number of teams, participating in the championship is _____.
48. The total number of ways in which six '+' and four '-' signs can be arranged in a line such that no two signs '-' occur together is _____.
49. A committee of 6 is to be chosen from 10 men and 7 women so as to contain at least 3 men and 2 women. In how many different ways can this be done if two particular women refuse to serve on the same committee.
[Hint: At least 3 men and 2 women: The number of ways = ${}^{10} C_3 \times {}^7 C_3 + {}^{10} C_4 \times {}^7 C_2$.
For 2 particular women to be always there: the number of ways = ${}^{10} C_4 + {}^{10} C_3 \times {}^5 C_1$.
The total number of committees when two particular women are never together = Total - together.]
50. A box contains 2 white balls, 3 black balls and 4 red balls. The number of ways three balls be drawn from the box if at least one black ball is to be included in the draw is _____.

True or False Type Questions

51. There are 12 points in a plane of which 5 points are collinear, then the number of lines obtained by joining these points in pairs is ${}^{12} C_2 - {}^5 C_2$.
52. Three letters can be posted in five letterboxes in 3^5 ways.
53. In the permutations of n things, r taken together, the number of permutations in which m particular things occur together is ${}^{n-m} P_{r-m} \times {}^r P_m$.

54. In a steamer there are stalls for 12 animals, and there are horses, cows and calves (not less than 12 each) ready to be shipped. They can be loaded in 3^{12} ways.
55. If some or all of n objects are taken at a time, the number of combinations is $2^n - 1$.
56. There will be only 24 selections containing at least one red ball out of a bag containing 4 red and 5 black balls. It is being given that the balls of the same colour are identical.
57. Eighteen guests are to be seated, half on each side of a long table. Four particular guests desire to sit on one particular side and three others on other side of the table. The number of ways in which the seating arrangements can be made is $\frac{11!}{5!6!}(9!)(9!)$.
- [Hint: After sending 4 on one side and 3 on the other side, we have to select out of 11; 5 on one side and 6 on the other. Now there are 9 on each side of the long table and each can be arranged in $9!$ ways.]
58. A candidate is required to answer 7 questions out of 12 questions which are divided into two groups, each containing 6 questions. He is not permitted to attempt more than 5 questions from either group. He can choose the seven questions in 650 ways.
59. To fill 12 vacancies there are 25 candidates of which 5 are from scheduled castes. If 3 of the vacancies are reserved for scheduled caste candidates while the rest are open to all, the number of ways in which the selection can be made is ${}^5C_3 \times {}^{20}C_9$.

Match Type Questions

In each if the Exercises from 60 to 64 match each item given under the column C_1 to its correct answer given under the column C_2 .

60. There are 3 books on Mathematics, 4 on Physics and 5 on English. How many different collections can be made such that each collection consists of :

C_1	C_2
(a) One book of each subject;	(i) 3968
(b) At least one book of each subject :	(ii) 60
(c) At least one book of English:	(iii) 3255

61. Five boys and five girls form a line. Find the number of ways of making the seating arrangement under the following condition:

C_1

C_2

- | | |
|--|-------------------------|
| (a) Boys and girls alternate: | (i) $5! \times 6!$ |
| (b) No two girls sit together : | (ii) $10! - 5! 6!$ |
| (c) All the girls sit together | (iii) $(5!)^2 + (5!)^2$ |
| (d) All the girls are never together : | (iv) $2! 5! 5!$ |

62. There are 10 professors and 20 lecturers out of whom a committee of 2 professors and 3 lecturer is to be formed. Find :

C_1

C_2

- | | |
|--|---------------------------------|
| (a) In how many ways committee :
can be formed | (i) $^{10}C_2 \times ^{19}C_3$ |
| (b) In how many ways a particular :
professor is included | (ii) $^{10}C_2 \times ^{19}C_2$ |
| (c) In how many ways a particular :
lecturer is included | (iii) $^9C_1 \times ^{20}C_3$ |
| (d) In how many ways a particular :
lecturer is excluded | (iv) $^{10}C_2 \times ^{20}C_3$ |

63. Using the digits 1, 2, 3, 4, 5, 6, 7, a number of 4 different digits is formed. Find

C_1

C_2

- | | |
|--|-----------|
| (a) how many numbers are formed? | (i) 840 |
| (b) how many numbers are exactly
divisible by 2? | (ii) 200 |
| (c) how many numbers are exactly
divisible by 25? | (iii) 360 |
| (d) how many of these are exactly
divisible by 4? | (iv) 40 |

64. How many words (with or without dictionary meaning) can be made from the letters of the word MONDAY, assuming that no letter is repeated, if

C_1

C_2

- | | |
|--|-----------|
| (a) 4 letters are used at a time | (i) 720 |
| (b) All letters are used at a time | (ii) 240 |
| (c) All letters are used but the
first is a vowel | (iii) 360 |

Answers to Objective Type Questions

26. A	27. B	28. C	29. B
30. C	31. A	32. B	33. D
34. B	35. C	36. D	37. A
38. C	39. B	40. B	

5. STATISTICS

Short Type Questions

1. Find the mean deviation about the mean of the distribution:

Size	20	21	22	23	24
Frequency	6	4	5	1	4

2. Find the mean deviation about the median of the following distribution:

Marks obtained	10	11	12	14	15
No. of students	2	3	8	3	4

3. Calculate the mean deviation about the mean of the set of first n natural numbers when n is an odd number.
4. Calculate the mean deviation about the mean of the set of first n natural numbers when n is an even number.
5. Find the standard deviation of the first n natural numbers.
6. The mean and standard deviation of some data for the time taken to complete a test are calculated with the following results:

Number of observations = 25, mean = 18.2 seconds, standard deviation = 3.25 seconds.

Further, another set of 15 observations x_1, x_2, \dots, x_{15} , also in seconds, is now

available and we have $\sum_{i=1}^{15} x_i = 279$ and $\sum_{i=1}^{15} x_i^2 = 5524$. Calculate the standard derivation based on all 40 observations.

7. The mean and standard deviation of a set of n_1 observations are \bar{x}_1 and s_1 , respectively while the mean and standard deviation of another set of n_2 observations are \bar{x}_2 and s_2 , respectively. Show that the standard deviation of the combined set of $(n_1 + n_2)$ observations is given by

$$\text{S.D.} = \sqrt{\frac{n_1(s_1)^2 + n_2(s_2)^2}{n_1 + n_2} + \frac{n_1 n_2 (\bar{x}_1 - \bar{x}_2)^2}{(n_1 + n_2)^2}}$$

8. Two sets each of 20 observations, have the same standard derivation 5. The first set has a mean 17 and the second a mean 22. Determine the standard deviation of the set obtained by combining the given two sets.
9. The frequency distribution:

x	A	2A	3A	4A	5A	6A
f	2	1	1	1	1	1

where A is a positive integer, has a variance of 160. Determine the value of A.

10. For the frequency distribution:

x	2	3	4	5	6	7
f	4	9	16	14	11	6

Find the standard distribution.

11. There are 60 students in a class. The following is the frequency distribution of the marks obtained by the students in a test:

Marks	0	1	2	3	4	5
Frequency	$x - 2$	x	x^2	$(x + 1)^2$	$2x$	$x + 1$

where x is a positive integer. Determine the mean and standard deviation of the marks.

12. The mean life of a sample of 60 bulbs was 650 hours and the standard deviation was 8 hours. A second sample of 80 bulbs has a mean life of 660 hours and standard deviation 7 hours. Find the overall standard deviation.
13. Mean and standard deviation of 100 items are 50 and 4, respectively. Find the sum of all the item and the sum of the squares of the items.
14. If for a distribution $\sum(x-5)=3$, $\sum(x-5)^2=43$ and the total number of item is 18, find the mean and standard deviation.
15. Find the mean and variance of the frequency distribution given below:

x	$1 \leq x < 3$	$3 \leq x < 5$	$5 \leq x < 7$	$7 \leq x < 10$
f	6	4	5	1

Long Type Questions

16. Calculate the mean deviation about the mean for the following frequency distribution:

Class interval	0 - 4	4 - 8	8 - 12	12 - 16	16 - 20
Frequency	4	6	8	5	2

17. Calculate the mean deviation from the median of the following data:

Class interval	0 - 6	6 - 12	12 - 18	18 - 24	24 - 30
Frequency	4	5	3	6	2

18. Determine the mean and standard deviation for the following distribution:

Marks	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Frequency	1	6	6	8	8	2	2	3	0	2	1	0	0	0	1

19. The weights of coffee in 70 jars is shown in the following table:

Weight (in grams)	Frequency
200 - 201	13
201 - 202	27
202 - 203	18
203 - 204	10
204 - 205	1
205 - 206	1

Determine variance and standard deviation of the above distribution.

20. Determine mean and standard deviation of first n terms of an A.P. whose first term is a and common difference is d .
21. Following are the marks obtained, out of 100, by two students Ravi and Hashina in 10 tests.

Ravi	25	50	45	30	70	42	36	48	35	60
Hashina	10	70	50	20	95	55	42	60	48	80

Who is more intelligent and who is more consistent?

22. Mean and standard deviation of 100 observations were found to be 40 and 10, respectively. If at the time of calculation two observations were wrongly taken as 30 and 70 in place of 3 and 27 respectively, find the correct standard deviation.
23. While calculating the mean and variance of 10 readings, a student wrongly used the reading 52 for the correct reading 25. He obtained the mean and variance as 45 and 16 respectively. Find the correct mean and the variance.

Objective Type Questions

24. The mean deviation of the data 3, 10, 10, 4, 7, 10, 5 from the mean is
(A) 2 (B) 2.57 (C) 3 (D) 3.75
25. Mean deviation for n observations x_1, x_2, \dots, x_n from their mean \bar{x} is given by
(A) $\sum_{i=1}^n (x_i - \bar{x})$ (B) $\frac{1}{n} \sum_{i=1}^n |x_i - \bar{x}|$
(C) $\sum_{i=1}^n (x_i - \bar{x})^2$ (D) $\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$
26. When tested, the lives (in hours) of 5 bulbs were noted as follows:
1357, 1090, 1666, 1494, 1623
The mean deviations (in hours) from their mean is
(A) 178 (B) 179 (C) 220 (D) 356
27. Following are the marks obtained by 9 students in a mathematics test:
50, 69, 20, 33, 53, 39, 40, 65, 59
The mean deviation from the median is:
(A) 9 (B) 10.5 (C) 12.67 (D) 14.76
28. The standard deviation of the data 6, 5, 9, 13, 12, 8, 10 is
(A) $\sqrt{\frac{52}{7}}$ (B) $\frac{52}{7}$ (C) $\sqrt{6}$ (D) 6
29. Let x_1, x_2, \dots, x_n be n observations and \bar{x} be their arithmetic mean. The formula for the standard deviation is given by
(A) $\sum (x_i - \bar{x})^2$ (B) $\frac{\sum (x_i - \bar{x})^2}{n}$
(C) $\sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}$ (D) $\sqrt{\frac{\sum x_i^2}{n} + \bar{x}^2}$
30. The mean of 100 observations is 50 and their standard deviation is 5. The sum of all squares of all the observations is
(A) 50000 (B) 250000 (C) 252500 (D) 255000
31. Let a, b, c, d, e be the observations with mean m and standard deviation s . The standard deviation of the observations $a + k, b + k, c + k, d + k, e + k$ is
(A) s (B) ks (C) $s + k$ (D) $\frac{s}{k}$
32. Let x_1, x_2, x_3, x_4, x_5 be the observations with mean m and standard deviation s . The standard deviation of the observations $kx_1, kx_2, kx_3, kx_4, kx_5$ is
(A) $k + s$ (B) $\frac{s}{k}$ (C) ks (D) s
33. Let x_1, x_2, \dots, x_n be n observations. Let $w_i = lx_i + k$ for $i = 1, 2, \dots, n$, where l and k are constants. If the mean of x_i 's is 48 and their standard deviation is 12, the mean of w_i 's is 55 and standard deviation of w_i 's is 15, the values of l and k should be
(A) $l = 1.25, k = -5$ (B) $l = -1.25, k = 5$
(C) $l = 2.5, k = -5$ (D) $l = 2.5, k = 5$
34. Standard deviations for first 10 natural numbers is
(A) 5.5 (B) 3.87 (C) 2.97 (D) 2.87
35. Consider the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. If 1 is added to each number, the variance of the numbers so obtained is
(A) 6.5 (B) 2.87 (C) 3.87 (D) 8.25

36. Consider the first 10 positive integers. If we multiply each number by -1 and then add 1 to each number, the variance of the numbers so obtained is
 (A) 8.25 (B) 6.5 (C) 3.87 (D) 2.87
37. The following information relates to a sample of size 60: $\sum x^2 = 18000$,
 $\sum x = 960$
 The variance is
 (A) 6.63 (B) 16 (C) 22 (D) 44
38. Coefficient of variation of two distributions are 50 and 60, and their arithmetic means are 30 and 25 respectively. Difference of their standard deviation is
 (A) 0 (B) 1 (C) 1.5 (D) 2.5
39. The standard deviation of some temperature data in $^{\circ}\text{C}$ is 5. If the data were converted into $^{\circ}\text{F}$, the variance would be
 (A) 81 (B) 57 (C) 36 (D) 25

Fill in the Blanks Type Questions

40. Coefficient of variation = $\frac{\dots}{\text{Mean}} \times 100$

41. If \bar{x} is the mean of n values of x , then $\sum_{i=1}^n (x_i - \bar{x})$ is always equal to _____.

If a has any value other than \bar{x} , then $\sum_{i=1}^n (x_i - \bar{x})^2$ is _____ than

$$\sum (x_i - a)^2$$

42. If the variance of a data is 121, then the standard deviation of the data is _____.
43. The standard deviation of a data is _____ of any change in origin, but is _____ on the change of scale.
44. The sum of the squares of the deviations of the values of the variable is _____ when taken about their arithmetic mean.
45. The mean deviation of the data is _____ when measured from the median.
46. The standard deviation is _____ to the mean deviation taken from the arithmetic mean.

Answers to Objective Type Questions

24. B	25. B	26. B	27. C
28. A	29. C	30. C	31. A
32. C	33. A	34. D	35. D
36. A	37. D	38. A	39. A

3 DIMENSION

1. Locate the following points:
 - (i) $(1, -1, 3)$,
 - (ii) $(-1, 2, 4)$
 - (iii) $(-2, -4, -7)$
 - (iv) $(-4, 2, -5)$.
2. Name the octant in which each of the following points lies.
 - (i) $(1, 2, 3)$,
 - (ii) $(4, -2, 3)$,
 - (iii) $(4, -2, -5)$
 - (iv) $(4, 2, -5)$
 - (v) $(-4, 2, 5)$
 - (vi) $(-3, -1, 6)$
 - (vii) $(2, -4, -7)$
 - (viii) $(-4, 2, -5)$.
3. Let A, B, C be the feet of perpendiculars from a point P on the x , y , z -axis respectively. Find the coordinates of A, B and C in each of the following where the point P is :
 - (i) $A = (3, 4, 2)$
 - (ii) $(-5, 3, 7)$
 - (iii) $(4, -3, -5)$
4. Let A, B, C be the feet of perpendiculars from a point P on the xy , yz and zx -planes respectively. Find the coordinates of A, B, C in each of the following where the point P is
 - (i) $(3, 4, 5)$
 - (ii) $(-5, 3, 7)$
 - (iii) $(4, -3, -5)$.
5. How far apart are the points $(2, 0, 0)$ and $(-3, 0, 0)$?
6. Find the distance from the origin to $(6, 6, 7)$.
7. Show that if $x^2 + y^2 = 1$, then the point $(x, y, \sqrt{1-x^2-y^2})$ is at a distance 1 unit from the origin.
8. Show that the point A $(1, -1, 3)$, B $(2, -4, 5)$ and $(5, -13, 11)$ are collinear.
9. Three consecutive vertices of a parallelogram ABCD are A $(6, -2, 4)$, B $(2, 4, -8)$, C $(-2, 2, 4)$. Find the coordinates of the fourth vertex.
[Hint: Diagonals of a parallelogram have the same mid-point.]
10. Show that the triangle ABC with vertices A $(0, 4, 1)$, B $(2, 3, -1)$ and C $(4, 5, 0)$ is right angled.
11. Find the third vertex of triangle whose centroid is origin and two vertices are $(2, 4, 6)$ and $(0, -2, -5)$.
12. Find the centroid of a triangle, the mid-point of whose sides are D $(1, 2, -3)$, E $(3, 0, 1)$ and F $(-1, 1, -4)$.
13. The mid-points of the sides of a triangle are $(5, 7, 11)$, $(0, 8, 5)$ and $(2, 3, -1)$. Find its vertices.
14. Three vertices of a Parallelogram ABCD are A $(1, 2, 3)$, B $(-1, -2, -1)$ and C $(2, 3, 2)$. Find the fourth vertex D.
15. Find the coordinate of the points which trisect the line segment joining the points A $(2, 1, -3)$ and B $(5, -8, 3)$.
16. If the origin is the centroid of a triangle ABC having vertices A $(a, 1, 3)$, B $(-2, b, -5)$ and C $(4, 7, c)$, find the values of a, b, c .
17. Let A $(2, 2, -3)$, B $(5, 6, 9)$ and C $(2, 7, 9)$ be the vertices of a triangle. The internal bisector of the angle A meets BC at the point D. Find the coordinates of D.

BINOMIAL THEOREM

1. Find the term independent of x , $x \neq 0$, in the expansion of $\left(\frac{3x^2}{2} - \frac{1}{3x}\right)^{15}$.
2. If the term free from x in the expansion of $\left(\sqrt{x} - \frac{k}{x^2}\right)^{10}$ is 405, find the value of k .
3. Find the coefficient of x in the expansion of $(1 - 3x + 7x^2)(1 - x)^{16}$.
4. Find the term independent of x in the expansion of, $\left(3x - \frac{2}{x^2}\right)^{15}$.
5. Find the middle term (terms) in the expansion of
 - (i) $\left(\frac{x}{a} - \frac{a}{x}\right)^{10}$
 - (ii) $\left(3x - \frac{x^3}{6}\right)^9$
6. Find the coefficient of x^{15} in the expansion of $(x - x^2)^{10}$.
7. Find the coefficient of $\frac{1}{x^{17}}$ in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$.
8. Find the sixth term of the expansion $\left(y^{\frac{1}{2}} + x^{\frac{1}{3}}\right)^n$, if the binomial coefficient of the third term from the end is 45.
[Hint: Binomial coefficient of third term from the end = Binomial coefficient of third term from beginning = nC_2 .]
9. Find the value of r , if the coefficients of $(2r + 4)^{\text{th}}$ and $(r - 2)^{\text{th}}$ terms in the expansion of $(1 + x)^{18}$ are equal.
10. If the coefficient of second, third and fourth terms in the expansion of $(1 + x)^{2n}$ are in A.P. Show that $2n^2 - 9n + 7 = 0$.
11. Find the coefficient of x^4 in the expansion of $(1 + x + x^2 + x^3)^{11}$.

12. If p is a real number and if the middle term in the expansion of $\left(\frac{p}{2} + 2\right)^8$ is 1120, find p .

13. Show that the middle term in the expansion of $\left(x - \frac{1}{x}\right)^{2n}$ is

$$\frac{1 \times 3 \times 5 \times \dots \times (2n-1)}{\binom{2n}{n}} \times (-2)^n.$$

14. Find n in the binomial $\left(\sqrt[3]{2} + \frac{1}{\sqrt[3]{3}}\right)^n$ if the ratio of 7th term from the beginning to the 7th term from the end is $\frac{1}{6}$.

15. In the expansion of $(x + a)^n$ if the sum of odd terms is denoted by O and the sum of even term by E .

Then prove that

(i) $O^2 - E^2 = (x^2 - a^2)^n$

(ii) $4OE = (x + a)^{2n} - (x - a)^{2n}$

16. If x^p occurs in the expansion of $\left(x^2 + \frac{1}{x}\right)^{2n}$, prove that its coefficient is

$$\frac{\binom{2n}{4n-p}}{3} \frac{\binom{2n}{2n+p}}{3}.$$

17. Find the term independent of x in the expansion of $(1 + x + 2x^3) \left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$.

COMPLEX NUMBERS

1. For a positive integer n , find the value of $(1-i)^n \left(1-\frac{1}{i}\right)^n$
2. Evaluate $\sum_{n=1}^{13} (i^n + i^{n+1})$, where $n \in \mathbb{N}$.
3. If $\left(\frac{1+i}{1-i}\right)^3 - \left(\frac{1-i}{1+i}\right)^3 = x + iy$, then find (x, y) .
4. If $\frac{(1+i)^2}{2-i} = x + iy$, then find the value of $x + y$.
5. If $\left(\frac{1-i}{1+i}\right)^{100} = a + ib$, then find (a, b) .
6. If $a = \cos \theta + i \sin \theta$, find the value of $\frac{1+a}{1-a}$.
7. If $(1+i)z = (1-i)\bar{z}$, then show that $z = -i\bar{z}$.
8. If $z = x + iy$, then show that $z\bar{z} + 2(z + \bar{z}) + b = 0$, where $b \in \mathbb{R}$, represents a circle.
9. If the real part of $\frac{\bar{z}+2}{\bar{z}-1}$ is 4, then show that the locus of the point representing z in the complex plane is a circle.
10. Show that the complex number z , satisfying the condition $\arg\left(\frac{z-1}{z+1}\right) = \frac{\pi}{4}$ lies on a circle.
11. Solve the equation $|z| = z + 1 + 2i$.

12. If $|z+1| = z + 2(1+i)$, then find z .
13. If $\arg(z-1) = \arg(z+3i)$, then find $x-1 : y$, where $z = x + iy$.
14. Show that $\left| \frac{z-2}{z-3} \right| = 2$ represents a circle. Find its centre and radius.
15. If $\frac{z-1}{z+1}$ is a purely imaginary number ($z \neq -1$), then find the value of $|z|$.
16. z_1 and z_2 are two complex numbers such that $|z_1| = |z_2|$ and $\arg(z_1) + \arg(z_2) = \pi$, then show that $z_1 = -\bar{z}_2$.
17. If $|z_1| = 1$ ($z_1 \neq -1$) and $z_2 = \frac{z_1-1}{z_1+1}$, then show that the real part of z_2 is zero.
18. If z_1, z_2 and z_3, z_4 are two pairs of conjugate complex numbers, then find $\arg\left(\frac{z_1}{z_4}\right) + \arg\left(\frac{z_2}{z_3}\right)$.
19. If $|z_1| = |z_2| = \dots = |z_n| = 1$, then show that $|z_1 + z_2 + z_3 + \dots + z_n| = \left| \frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3} + \dots + \frac{1}{z_n} \right|$.
20. If for complex numbers z_1 and z_2 , $\arg(z_1) - \arg(z_2) = 0$, then show that $|z_1 - z_2| = |z_1| - |z_2|$.
21. Solve the system of equations $\operatorname{Re}(z^2) = 0$, $|z| = 2$.
22. Find the complex number satisfying the equation $z + \sqrt{2}|z+1| + i = 0$.
23. Write the complex number $z = \frac{1-i}{\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}}$ in polar form.
24. If z and w are two complex numbers such that $|zw| = 1$ and $\arg(z) - \arg(w) = \frac{\pi}{2}$, then show that $\bar{z}w = -i$.

CONIC SECTION

1. Find the equation of the circle which touches the both axes in first quadrant and whose radius is a .
2. Show that the point (x, y) given by $x = \frac{2at}{1+t^2}$ and $y = \frac{a(1-t^2)}{1+t^2}$ lies on a circle for all real values of t such that $-1 \leq t \leq 1$ where a is any given real numbers.
3. If a circle passes through the point $(0, 0)$ $(a, 0)$, $(0, b)$ then find the coordinates of its centre.
4. Find the equation of the circle which touches x -axis and whose centre is $(1, 2)$.
5. If the lines $3x - 4y + 4 = 0$ and $6x - 8y - 7 = 0$ are tangents to a circle, then find the radius of the circle.
[Hint: Distance between given parallel lines gives the diameter of the circle.]
6. Find the equation of a circle which touches both the axes and the line $3x - 4y + 8 = 0$ and lies in the third quadrant.
[Hint: Let a be the radius of the circle, then $(-a, -a)$ will be centre and perpendicular distance from the centre to the given line gives the radius of the circle.]
7. If one end of a diameter of the circle $x^2 + y^2 - 4x - 6y + 11 = 0$ is $(3, 4)$, then find the coordinate of the other end of the diameter.
8. Find the equation of the circle having $(1, -2)$ as its centre and passing through $3x + y = 14$, $2x + 5y = 18$
9. If the line $y = \sqrt{3}x + k$ touches the circle $x^2 + y^2 = 16$, then find the value of k .
[Hint: Equate perpendicular distance from the centre of the circle to its radius.]
10. Find the equation of a circle concentric with the circle $x^2 + y^2 - 6x + 12y + 15 = 0$ and has double of its area.
[Hint: concentric circles have the same centre.]
11. If the latus rectum of an ellipse is equal to half of minor axis, then find its eccentricity.
12. Given the ellipse with equation $9x^2 + 25y^2 = 225$, find the eccentricity and foci.
13. If the eccentricity of an ellipse is $\frac{5}{8}$ and the distance between its foci is 10, then find latus rectum of the ellipse.
14. Find the equation of ellipse whose eccentricity is $\frac{2}{3}$, latus rectum is 5 and the centre is $(0, 0)$.
15. Find the distance between the directrices of the ellipse $\frac{x^2}{36} + \frac{y^2}{20} = 1$.
16. Find the coordinates of a point on the parabola $y^2 = 8x$ whose focal distance is 4.
17. Find the length of the line-segment joining the vertex of the parabola $y^2 = 4ax$ and a point on the parabola where the line-segment makes an angle θ to the x -axis.
18. If the points $(0, 4)$ and $(0, 2)$ are respectively the vertex and focus of a parabola, then find the equation of the parabola.
19. If the line $y = mx + 1$ is tangent to the parabola $y^2 = 4x$ then find the value of m .
[Hint: Solving the equation of line and parabola, we obtain a quadratic equation and then apply the tangency condition giving the value of m .]
20. If the distance between the foci of a hyperbola is 16 and its eccentricity is $\sqrt{2}$, then obtain the equation of the hyperbola.
21. Find the eccentricity of the hyperbola $9y^2 - 4x^2 = 36$.
22. Find the equation of the hyperbola with eccentricity $\frac{3}{2}$ and foci at $(\pm 2, 0)$.

23. If the lines $2x - 3y = 5$ and $3x - 4y = 7$ are the diameters of a circle of area 154 square units, then obtain the equation of the circle.
24. Find the equation of the circle which passes through the points $(2, 3)$ and $(4, 5)$ and the centre lies on the straight line $y - 4x + 3 = 0$.
25. Find the equation of a circle whose centre is $(3, -1)$ and which cuts off a chord of length 6 units on the line $2x - 5y + 18 = 0$.

[Hint: To determine the radius of the circle, find the perpendicular distance from the centre to the given line.]

26. Find the equation of a circle of radius 5 which is touching another circle $x^2 + y^2 - 2x - 4y - 20 = 0$ at $(5, 5)$.
27. Find the equation of a circle passing through the point $(7, 3)$ having radius 3 units and whose centre lies on the line $y = x - 1$.
28. Find the equation of each of the following parabolas
 (a) Directrix $x = 0$, focus at $(6, 0)$ (b) Vertex at $(0, 4)$, focus at $(0, 2)$
 (c) Focus at $(-1, -2)$, directrix $x - 2y + 3 = 0$
29. Find the equation of the set of all points the sum of whose distances from the points $(3, 0)$ and $(9, 0)$ is 12.
30. Find the equation of the set of all points whose distance from $(0, 4)$ are $\frac{2}{3}$ of their distance from the line $y = 9$.
31. Show that the set of all points such that the difference of their distances from $(4, 0)$ and $(-4, 0)$ is always equal to 2 represent a hyperbola.
32. Find the equation of the hyperbola with
 (a) Vertices $(\pm 5, 0)$, foci $(\pm 7, 0)$ (b) Vertices $(0, \pm 7)$, $e = \frac{4}{3}$
 (c) Foci $(0, \pm \sqrt{10})$, passing through $(2, 3)$

LIMITS AND DERIVATIVES

Evaluate :

1. $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$
2. $\lim_{x \rightarrow \frac{1}{2}} \frac{4x^2 - 1}{2x - 1}$
3. $\lim_{h \rightarrow 0} \frac{\sqrt{x+h} - \sqrt{x}}{h}$
4. $\lim_{x \rightarrow 0} \frac{(x+2)^{\frac{1}{3}} - 2^{\frac{1}{3}}}{x}$
5. $\lim_{x \rightarrow 1} \frac{(1+x)^6 - 1}{(1+x)^2 - 1}$
6. $\lim_{x \rightarrow a} \frac{(2+x)^{\frac{5}{2}} - (a+2)^{\frac{5}{2}}}{x-a}$
7. $\lim_{x \rightarrow 1} \frac{x^4 - \sqrt{x}}{\sqrt{x} - 1}$
8. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{\sqrt{3x-2} - \sqrt{x+2}}$
9. $\lim_{x \rightarrow \sqrt{2}} \frac{x^4 - 4}{x^2 + 3\sqrt{2x} - 8}$
10. $\lim_{x \rightarrow 1} \frac{x^7 - 2x^5 + 1}{x^3 - 3x^2 + 2}$
11. $\lim_{x \rightarrow 0} \frac{\sqrt{1+x^3} - \sqrt{1-x^3}}{x^2}$
12. $\lim_{x \rightarrow -3} \frac{x^3 + 27}{x^5 + 243}$
13. $\lim_{x \rightarrow \frac{1}{2}} \left(\frac{8x-3}{2x-1} - \frac{4x^2+1}{4x^2-1} \right)$
14. Find 'n', if $\lim_{x \rightarrow 2} \frac{x^n - 2^n}{x-2} = 80$, $n \in \mathbf{N}$
15. $\lim_{x \rightarrow a} \frac{\sin 3x}{\sin 7x}$
16. $\lim_{x \rightarrow 0} \frac{\sin^2 2x}{\sin^2 4x}$
17. $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x^2}$
18. $\lim_{x \rightarrow 0} \frac{2 \sin x - \sin 2x}{x^3}$
19. $\lim_{x \rightarrow 0} \frac{1 - \cos mx}{1 - \cos nx}$
20. $\lim_{x \rightarrow \frac{\pi}{3}} \frac{\sqrt{1 - \cos 6x}}{\sqrt{2} \left(\frac{\pi}{3} - x \right)}$
21. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \frac{\pi}{4}}$
22. $\lim_{x \rightarrow \frac{\pi}{6}} \frac{\sqrt{3} \sin x - \cos x}{x - \frac{\pi}{6}}$
23. $\lim_{x \rightarrow 0} \frac{\sin 2x + 3x}{2x + \tan 3x}$
24. $\lim_{x \rightarrow a} \frac{\sin x - \sin a}{\sqrt{x} - \sqrt{a}}$
25. $\lim_{x \rightarrow \frac{\pi}{6}} \frac{\cot^2 x - 3}{\operatorname{cosec} x - 2}$
26. $\lim_{x \rightarrow 0} \frac{\sqrt{2} - \sqrt{1 + \cos x}}{\sin^2 x}$
27. $\lim_{x \rightarrow 0} \frac{\sin x - 2 \sin 3x + \sin 5x}{x}$
28. If $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$, then find the value of k .

Differentiate each of the functions w. r. to x in Exercises 29 to 42.

29. $\frac{x^4 + x^3 + x^2 + 1}{x}$
30. $\left(x + \frac{1}{x} \right)^3$
31. $(3x + 5)(1 + \tan x)$
32. $(\sec x - 1)(\sec x + 1)$
33. $\frac{3x + 4}{5x^2 - 7x + 9}$
34. $\frac{x^5 - \cos x}{\sin x}$
35. $\frac{x^2 \cos \frac{\pi}{4}}{\sin x}$
36. $(ax^2 + \cot x)(p + q \cos x)$
37. $\frac{a + b \sin x}{c + d \cos x}$
38. $(\sin x + \cos x)^2$
39. $(2x - 7)^2 (3x + 5)^3$
40. $x^2 \sin x + \cos 2x$
41. $\sin^3 x \cos^3 x$
42. $\frac{1}{ax^2 + bx + c}$

LINEAR INEQUALITIES

- $\frac{4}{x+1} \leq 3 \leq \frac{6}{x+1}, (x > 0)$
- $\frac{|x-2|-1}{|x-2|-2} \leq 0$
- $\frac{1}{|x|-3} \leq \frac{1}{2}$
- $|x-1| \leq 5, |x| \geq 2$
- $-5 \leq \frac{2-3x}{4} \leq 9$
- $4x+3 \geq 2x+17, 3x-5 < -2.$
- A company manufactures cassettes. Its cost and revenue functions are $C(x) = 26,000 + 30x$ and $R(x) = 43x$, respectively, where x is the number of cassettes produced and sold in a week. How many cassettes must be sold by the company to realise some profit?
- The water acidity in a pool is considered normal when the average pH reading of three daily measurements is between 8.2 and 8.5. If the first two pH readings are 8.48 and 8.35, find the range of pH value for the third reading that will result in the acidity level being normal.
- A solution of 9% acid is to be diluted by adding 3% acid solution to it. The resulting mixture is to be more than 5% but less than 7% acid. If there is 460 litres of the 9% solution, how many litres of 3% solution will have to be added?
- A solution is to be kept between 40°C and 45°C . What is the range of temperature in degree fahrenheit, if the conversion formula is $F = \frac{9}{5}C + 32$?
- The longest side of a triangle is twice the shortest side and the third side is 2 cm longer than the shortest side. If the perimeter of the triangle is more than 166 cm then find the minimum length of the shortest side.
- In drilling world's deepest hole it was found that the temperature T in degree celcius, x km below the earth's surface was given by $T = 30 + 25(x - 3)$, $3 \leq x \leq 15$. At what depth will the temperature be between 155°C and 205°C ?

13. Solve the following system of inequalities $\frac{2x+1}{7x-1} > 5, \frac{x+7}{x-8} > 2$

14. Find the linear inequalities for which the shaded region in the given figure is the solution set.

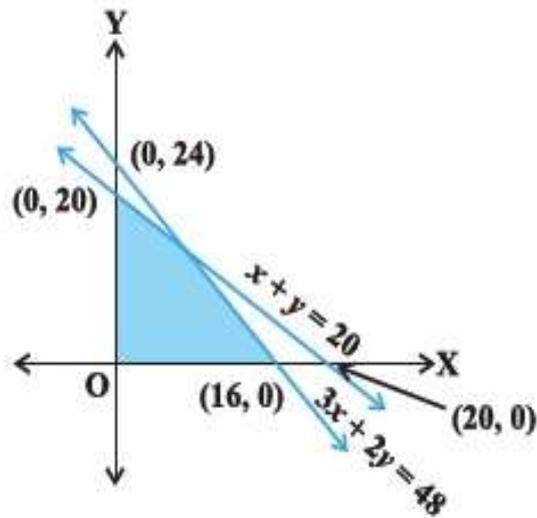


Fig 6.5

15. Find the linear inequalities for which the shaded region in the given figure is the solution set.

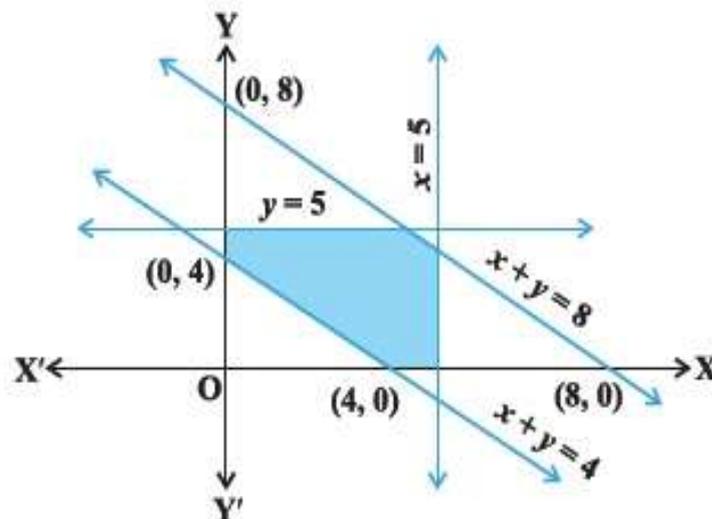


Fig 6.6

16. Show that the following system of linear inequalities has no solution $x + 2y \leq 3, 3x + 4y \geq 12, x \geq 0, y \geq 1$

17. Solve the following system of linear inequalities:

$$3x + 2y \geq 24, 3x + y \leq 15, x \geq 4$$

18. Show that the solution set of the following system of linear inequalities is an unbounded region

$$2x + y \geq 8, x + 2y \geq 10, x \geq 0, y \geq 0$$

PROBABILITY

1. If the letters of the word ALGORITHM are arranged at random in a row what is the probability the letters GOR must remain together as a unit?
2. Six new employees, two of whom are married to each other, are to be assigned six desks that are lined up in a row. If the assignment of employees to desks is made randomly, what is the probability that the married couple will have nonadjacent desks?
[Hint: First find the probability that the couple has adjacent desks, and then subtract it from 1.]
3. Suppose an integer from 1 through 1000 is chosen at random, find the probability that the integer is a multiple of 2 or a multiple of 9.
4. An experiment consists of rolling a die until a 2 appears.
 - (i) How many elements of the sample space correspond to the event that the 2 appears on the k^{th} roll of the die?
 - (ii) How many elements of the sample space correspond to the event that the 2 appears not later than the k^{th} roll of the die?
 [Hint:(a) First $(k - 1)$ rolls have 5 outcomes each and k^{th} rolls should result in 1 outcomes. (b) $1 + 5 + 5^2 + \dots + 5^{k-1}$.]
5. A die is loaded in such a way that each odd number is twice as likely to occur as each even number. Find $P(G)$, where G is the event that a number greater than 3 occurs on a single roll of the die.
6. In a large metropolitan area, the probabilities are .87, .36, .30 that a family (randomly chosen for a sample survey) owns a colour television set, a black and white television set, or both kinds of sets. What is the probability that a family owns either anyone or both kinds of sets?
7. If A and B are mutually exclusive events, $P(A) = 0.35$ and $P(B) = 0.45$, find
 - (a) $P(A')$
 - (b) $P(B')$
 - (c) $P(A \cup B)$
 - (d) $P(A \cap B)$
 - (e) $P(A \cap B')$
 - (f) $P(A' \cap B')$
8. A team of medical students doing their internship have to assist during surgeries at a city hospital. The probabilities of surgeries rated as very complex, complex, routine, simple or very simple are respectively, 0.15, 0.20, 0.31, 0.26, .08. Find the probabilities that a particular surgery will be rated
 - (a) complex or very complex;
 - (b) neither very complex nor very simple;
 - (c) routine or complex
 - (d) routine or simple
9. Four candidates A, B, C, D have applied for the assignment to coach a school cricket team. If A is twice as likely to be selected as B , and B and C are given about the same chance of being selected, while C is twice as likely to be selected as D , what are the probabilities that
 - (a) C will be selected?
 - (b) A will not be selected?
10. One of the four persons John, Rita, Aslam or Gurpreet will be promoted next month. Consequently the sample space consists of four elementary outcomes $S = \{\text{John promoted, Rita promoted, Aslam promoted, Gurpreet promoted}\}$ You are told that the chances of John's promotion is same as that of Gurpreet, Rita's chances of promotion are twice as likely as Johns. Aslam's chances are four times that of John.
 - (a) Determine $P(\text{John promoted})$
 $P(\text{Rita promoted})$
 $P(\text{Aslam promoted})$
 $P(\text{Gurpreet promoted})$
 - (b) If $A = \{\text{John promoted or Gurpreet promoted}\}$, find $P(A)$.
11. The accompanying Venn diagram shows three events, $A, B,$ and C , and also the probabilities of the various intersections (for instance, $P(A \cap B) = .07$). Determine
 - (a) $P(A)$
 - (b) $P(B \cap \bar{C})$
 - (c) $P(A \cup B)$
 - (d) $P(A \cap \bar{B})$
 - (e) $P(B \cap C)$
 - (f) Probability of exactly one of the three occurs.

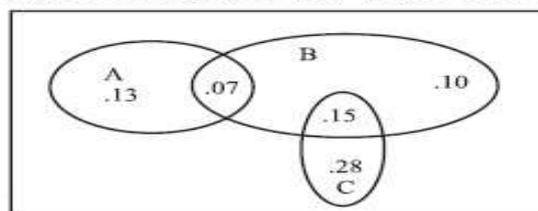


Fig. 16.2

12. One urn contains two black balls (labelled B1 and B2) and one white ball. A second urn contains one black ball and two white balls (labelled W1 and W2). Suppose the following experiment is performed. One of the two urns is chosen at random. Next a ball is randomly chosen from the urn. Then a second ball is chosen at random from the same urn without replacing the first ball.
- Write the sample space showing all possible outcomes
 - What is the probability that two black balls are chosen?
 - What is the probability that two balls of opposite colour are chosen?
13. A bag contains 8 red and 5 white balls. Three balls are drawn at random. Find the Probability that
- All the three balls are white
 - All the three balls are red
 - One ball is red and two balls are white
14. If the letters of the word ASSASSINATION are arranged at random. Find the Probability that
- Four S's come consecutively in the word
 - Two I's and two N's come together
 - All A's are not coming together
 - No two A's are coming together.
15. A card is drawn from a deck of 52 cards. Find the probability of getting a king or a heart or a red card.
16. A sample space consists of 9 elementary outcomes e_1, e_2, \dots, e_9 whose probabilities are
- $$P(e_1) = P(e_2) = .08, P(e_3) = P(e_4) = P(e_5) = .1$$
- $$P(e_6) = P(e_7) = .2, P(e_8) = P(e_9) = .07$$
- Suppose $A = \{e_1, e_5, e_8\}$, $B = \{e_2, e_5, e_8, e_9\}$
- Calculate $P(A)$, $P(B)$, and $P(A \cap B)$
 - Using the addition law of probability, calculate $P(A \cup B)$
 - List the composition of the event $A \cup B$, and calculate $P(A \cup B)$ by adding the probabilities of the elementary outcomes.
 - Calculate $P(\bar{B})$ from $P(B)$, also calculate $P(\bar{B})$ directly from the elementary outcomes of \bar{B}
17. Determine the probability p , for each of the following events.
- An odd number appears in a single toss of a fair die.
 - At least one head appears in two tosses of a fair coin.
 - A king, 9 of hearts, or 3 of spades appears in drawing a single card from a well shuffled ordinary deck of 52 cards.
 - The sum of 6 appears in a single toss of a pair of fair dice.

PRINCIPLE OF MATHEMATICAL INDUCTION

1. Give an example of a statement $P(n)$ which is true for all $n \geq 4$ but $P(1)$, $P(2)$ and $P(3)$ are not true. Justify your answer.
2. Give an example of a statement $P(n)$ which is true for all n . Justify your answer.
Prove each of the statements in Exercises 3 - 16 by the Principle of Mathematical Induction:
3. $4^n - 1$ is divisible by 3, for each natural number n .
4. $2^{3n} - 1$ is divisible by 7, for all natural numbers n .
5. $n^3 - 7n + 3$ is divisible by 3, for all natural numbers n .
6. $3^{2n} - 1$ is divisible by 8, for all natural numbers n .
7. For any natural number n , $7^n - 2^n$ is divisible by 5.
8. For any natural number n , $x^n - y^n$ is divisible by $x - y$, where x and y are any integers with $x \neq y$.
9. $n^3 - n$ is divisible by 6, for each natural number $n \geq 2$.
10. $n(n^2 + 5)$ is divisible by 6, for each natural number n .
11. $n^2 < 2^n$ for all natural numbers $n \geq 5$.
12. $2n < (n + 2)!$ for all natural number n .
13. $\sqrt{n} < \frac{1}{\sqrt{1}} + \frac{1}{\sqrt{2}} + \dots + \frac{1}{\sqrt{n}}$, for all natural numbers $n \geq 2$.
14. $2 + 4 + 6 + \dots + 2n = n^2 + n$ for all natural numbers n .
15. $1 + 2 + 2^2 + \dots + 2^n = 2^{n+1} - 1$ for all natural numbers n .
16. $1 + 5 + 9 + \dots + (4n - 3) = n(2n - 1)$ for all natural numbers n .

Use the Principle of Mathematical Induction in the following Exercises.

17. A sequence a_1, a_2, a_3, \dots is defined by letting $a_1 = 3$ and $a_k = 7a_{k-1}$ for all natural numbers $k \geq 2$. Show that $a_n = 3 \cdot 7^{n-1}$ for all natural numbers.

18. A sequence b_0, b_1, b_2, \dots is defined by letting $b_0 = 5$ and $b_k = 4 + b_{k-1}$ for all natural numbers k . Show that $b_n = 5 + 4n$ for all natural number n using mathematical induction.

19. A sequence d_1, d_2, d_3, \dots is defined by letting $d_1 = 2$ and $d_k = \frac{d_{k-1}}{k}$ for all natural numbers, $k \geq 2$. Show that $d_n = \frac{2}{n!}$ for all $n \in \mathbb{N}$.

20. Prove that for all $n \in \mathbb{N}$

$$\cos \alpha + \cos (\alpha + \beta) + \cos (\alpha + 2\beta) + \dots + \cos (\alpha + (n - 1) \beta)$$

$$= \frac{\cos \left(\alpha + \left(\frac{n-1}{2} \right) \beta \right) \sin \left(\frac{n\beta}{2} \right)}{\sin \frac{\beta}{2}}$$

21. Prove that, $\cos \theta \cos 2\theta \cos 2^2\theta \dots \cos 2^{n-1}\theta = \frac{\sin 2^n \theta}{2^n \sin \theta}$, for all $n \in \mathbb{N}$.

22. Prove that, $\sin \theta + \sin 2\theta + \sin 3\theta + \dots + \sin n\theta = \frac{\sin n\theta \cdot \sin \frac{(n+1)\theta}{2}}{2 \sin \frac{\theta}{2}}$, for all $n \in \mathbb{N}$.

23. Show that $\frac{n^5}{5} + \frac{n^3}{3} + \frac{7n}{15}$ is a natural number for all $n \in \mathbb{N}$.

24. Prove that $\frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{2n} > \frac{13}{24}$, for all natural numbers $n > 1$.

25. Prove that number of subsets of a set containing n distinct elements is 2^n , for all $n \in \mathbb{N}$.

STRAIGHT LINES

1. Find the equation of the straight line which passes through the point $(1, -2)$ and cuts off equal intercepts from axes.
2. Find the equation of the line passing through the point $(5, 2)$ and perpendicular to the line joining the points $(2, 3)$ and $(3, -1)$.
3. Find the angle between the lines $y = (2 - \sqrt{3})(x + 5)$ and $y = (2 + \sqrt{3})(x - 7)$.
4. Find the equation of the lines which passes through the point $(3, 4)$ and cuts off intercepts from the coordinate axes such that their sum is 14.
5. Find the points on the line $x + y = 4$ which lie at a unit distance from the line $4x + 3y = 10$.
6. Show that the tangent of an angle between the lines $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{a} - \frac{y}{b} = 1$ is
$$\frac{2ab}{a^2 - b^2}$$
7. Find the equation of lines passing through $(1, 2)$ and making angle 30° with y -axis.
8. Find the equation of the line passing through the point of intersection of $2x + y = 5$ and $x + 3y + 8 = 0$ and parallel to the line $3x + 4y = 7$.
9. For what values of a and b the intercepts cut off on the coordinate axes by the line $ax + by + 8 = 0$ are equal in length but opposite in signs to those cut off by the line $2x - 3y + 6 = 0$ on the axes.
10. If the intercept of a line between the coordinate axes is divided by the point $(-5, 4)$ in the ratio $1 : 2$, then find the equation of the line.
11. Find the equation of a straight line on which length of perpendicular from the origin is four units and the line makes an angle of 120° with the positive direction of x -axis.
[Hint: Use normal form, here $\omega = 30^\circ$.]
12. Find the equation of one of the sides of an isosceles right angled triangle whose hypotenuse is given by $3x + 4y = 4$ and the opposite vertex of the hypotenuse is $(2, 2)$.

13. If the equation of the base of an equilateral triangle is $x + y = 2$ and the vertex is $(2, -1)$, then find the length of the side of the triangle.

[Hint: Find length of perpendicular (p) from $(2, -1)$ to the line and use $p = l \sin 60^\circ$, where l is the length of side of the triangle].

14. A variable line passes through a fixed point P . The algebraic sum of the perpendiculars drawn from the points $(2, 0)$, $(0, 2)$ and $(1, 1)$ on the line is zero. Find the coordinates of the point P .

[Hint: Let the slope of the line be m . Then the equation of the line passing through the fixed point $P(x_1, y_1)$ is $y - y_1 = m(x - x_1)$. Taking the algebraic sum of perpendicular distances equal to zero, we get $y - 1 = m(x - 1)$. Thus (x_1, y_1) is $(1, 1)$.]

15. In what direction should a line be drawn through the point $(1, 2)$ so that its point of intersection with the line $x + y = 4$ is at a distance $\frac{\sqrt{6}}{3}$ from the given point.

16. A straight line moves so that the sum of the reciprocals of its intercepts made on axes is constant. Show that the line passes through a fixed point.

[Hint: $\frac{x}{a} + \frac{y}{b} = 1$ where $\frac{1}{a} + \frac{1}{b} = \text{constant} = \frac{1}{k}$ (say). This implies that

$\frac{k}{a} + \frac{k}{b} = 1 \Rightarrow$ line passes through the fixed point (k, k) .]

17. Find the equation of the line which passes through the point $(-4, 3)$ and the portion of the line intercepted between the axes is divided internally in the ratio $5 : 3$ by this point.

18. Find the equations of the lines through the point of intersection of the lines $x - y + 1 = 0$ and $2x - 3y + 5 = 0$ and whose distance from the point $(3, 2)$ is $\frac{7}{5}$.

19. If the sum of the distances of a moving point in a plane from the axes is 1, then find the locus of the point. [Hint: Given that $|x| + |y| = 1$, which gives four sides of a square.]

20. P_1, P_2 are points on either of the two lines $y - \sqrt{3}|x| = 2$ at a distance of 5 units from their point of intersection. Find the coordinates of the foot of perpendiculars drawn from P_1, P_2 on the bisector of the angle between the given lines.

[Hint: Lines are $y = \sqrt{3}x + 2$ and $y = -\sqrt{3}x + 2$ according as $x \geq 0$ or $x < 0$. y -axis is the bisector of the angles between the lines. P_1, P_2 are the points on these lines at a distance of 5 units from the point of intersection of these lines which have a point on y -axis as common foot of perpendiculars from these points. The y -coordinate of the foot of the perpendicular is given by $2 + 5 \cos 30^\circ$.]

21. If p is the length of perpendicular from the origin on the line $\frac{x}{a} + \frac{y}{b} = 1$ and a^2, p^2, b^2 are in A.P, then show that $a^4 + b^4 = 0$.

SEQUENCE AND SERIES

1. The first term of an A.P. is a , and the sum of the first p terms is zero, show that the sum of its next q terms is $\frac{-a(p+q)q}{p-1}$. [Hint: Required sum = $S_{p+q} - S_p$]

2. A man saved Rs 66000 in 20 years. In each succeeding year after the first year he saved Rs 200 more than what he saved in the previous year. How much did he save in the first year?
3. A man accepts a position with an initial salary of Rs 5200 per month. It is understood that he will receive an automatic increase of Rs 320 in the very next month and each month thereafter.
- (a) Find his salary for the tenth month
- (b) What is his total earnings during the first year?
4. If the p th and q th terms of a G.P. are q and p respectively, show that its $(p+q)$ th

term is $\left(\frac{q^p}{p^q}\right)^{\frac{1}{p-q}}$.

5. A carpenter was hired to build 192 window frames. The first day he made five frames and each day, thereafter he made two more frames than he made the day before. How many days did it take him to finish the job?
6. We know the sum of the interior angles of a triangle is 180° . Show that the sums of the interior angles of polygons with 3, 4, 5, 6, ... sides form an arithmetic progression. Find the sum of the interior angles for a 21 sided polygon.
7. A side of an equilateral triangle is 20cm long. A second equilateral triangle is inscribed in it by joining the mid points of the sides of the first triangle. The process is continued as shown in the accompanying diagram. Find the perimeter of the sixth inscribed equilateral triangle.
8. In a potato race 20 potatoes are placed in a line at intervals of 4 metres with the first potato 24 metres from the starting point. A contestant is required to bring the potatoes back to the starting place one at a time. How far would he run in bringing back all the potatoes?
9. In a cricket tournament 16 school teams participated. A sum of Rs 8000 is to be awarded among themselves as prize money. If the last placed team is awarded Rs 275 in prize money and the award increases by the same amount for successive finishing places, how much amount will the first place team receive?
10. If $a_1, a_2, a_3, \dots, a_n$ are in A.P., where $a_i > 0$ for all i , show that

$$\frac{1}{\sqrt{a_1} + \sqrt{a_2}} + \frac{1}{\sqrt{a_2} + \sqrt{a_3}} + \dots + \frac{1}{\sqrt{a_{n-1}} + \sqrt{a_n}} = \frac{n-1}{\sqrt{a_1} + \sqrt{a_n}}$$

11. Find the sum of the series $(3^3 - 2^3) + (5^3 - 4^3) + (7^3 - 6^3) + \dots$ to (i) n terms (ii) 10 terms
12. Find the r th term of an A.P. sum of whose first n terms is $2n + 3n^2$.
[Hint: $a_n = S_n - S_{n-1}$]

13. If A is the arithmetic mean and G_1, G_2 be two geometric means between any two numbers, then prove that

$$2A = \frac{G_1^2}{G_2} + \frac{G_2^2}{G_1}$$

14. If $\theta_1, \theta_2, \theta_3, \dots, \theta_n$ are in A.P., whose common difference is d , show that

$$\sec\theta_1 \sec\theta_2 + \sec\theta_2 \sec\theta_3 + \dots + \sec\theta_{n-1} \sec\theta_n = \frac{\tan\theta_n - \tan\theta_1}{\sin d}$$

15. If the sum of p terms of an A.P. is q and the sum of q terms is p , show that the sum of $p + q$ terms is $-(p + q)$. Also, find the sum of first $p - q$ terms ($p > q$).

16. If $p^{\text{th}}, q^{\text{th}}$, and r^{th} terms of an A.P. and G.P. are both a, b and c respectively, show that

$$a^{b-c} \cdot b^{c-a} \cdot c^{a-b} = 1$$

Class XI

Subject-Pol Science

Chapters: Constitution – As a living Document & The Philosophy of the constitution

- 1) Why is Indian Constitution considered a living document?
- 2) Describe the procedure of amendment of the Indian constitution.
- 3) Why have there been so many amendments of the Indian constitution?
- 4) What kind of amendments have been made in the India constitution?
- 5) How rulings by the court contribute to the evolution of the constitution?
- 6) Explain the reason for requiring special majority for amending the constitution.
- 7) Many amendments to the constitution of Indian have been made due to different interpretations upheld by the Judiciary and the Parliament. Explain with examples.
- 8) What is the political philosophy of the Indian constitution?
- 9) On what grounds has Indian constitution been criticized?
- 10) What are the limitations of the Indian constitution?

Class -XI

Subject - Political Science

Topic - Election and Representation

1. What is the meaning of the term 'election'?
2. Why are elections important?
3. Define the termsa
 - a) Direct Democracy
 - b) Indirect Democracy
4. Define 'First Past the Post' system. How does this system work in India?
5. Explain Proportional Representation system as followed in Israel and Argentina.
6. Compare FPTP and PR system of election.
7. Why did India adopt the FPTP system?
8. What is the meaning of separate electorate?
9. What is the difference in separate electorate and reserved constituency?
10. For which legislative bodies does our constitution provide for reservation?
11. How many seats are reserved for Scheduled Castes and Scheduled Tribes?
12. Who decides which constituency is to be reserved? On what basis is this decision taken?
13. What is the present status of reservation for women?
14. Which article of the Indian constitution provide for an independent Election Commission?

विषय हिन्दी

प्रकरण 1 - काव्यांश

तुम भारत, हम भारतीय हैं, तुम माता, हम बेटे,
किसकी हिम्मत है कि तुम्हें दुष्टता-दृष्टि से देखे |
ओ माता, तुम एक अरब से अधिक भुजाओं वाली,
सबकी रक्षा में तुम सक्षम, हो अदम्य बलशाली |
भाषा, वेश, प्रदेश भिन्न हैं, फिर भी भाई-भाई,
भारत की साड़ी संस्कृति में पलते भारतवासी |
सुदिनों में हम एक साथ हँसते, गाते, सोते हैं,
दुर्दिन में भी साथ-साथ जागते, पौरुष धोते हैं |
तुम हो शस्य-श्यामला, खेतों में तुम लहराती हो,
प्रकृति प्राणमयी, साम-गानमयी, तुम न किसे भाती हो |
तुम न अगर होती तो धरती वसुधा क्यों कहलाती ?
गंगा कहाँ बहा करती, गीता क्यों गाई जाती ?

प्रश्न:

- (क) साड़ी संस्कृति का क्या भाव है ? 1
(ख) भारत को अदम्य बलशाली क्यों कहा गया है ? 1
(ग) सुख-दुःख के दिनों में भारतीयों का परस्पर सहयोग कैसा होता है ? 1
(घ) साम-गानमयी का क्या तात्पर्य है ? 1
(ङ) 'ओ माता, तुम एक अरब से अधिक भुजाओं वाली' में कौन-सा अलंकार है? 1

उत्तर -

- (क) भाषा, वेश, प्रदेश भिन्न होते हुए भी सभी के सुख-दुःख एक हैं |
(ख) भारत की एक अरब से अधिक जनता अपनी मजबूत भुजाओं से सबकी सुरक्षा करने में समर्थ है |
(ग) भारतीयों का व्यवहार आपसी सहयोग और अपनेपन से भरा है सब संग-संग हँसते-गाते हैं और संग-संग कठिनाइयों से जूझते हैं |
(घ) सुमधुर संगीत से युक्त |
(ङ) रूपक |

अभ्यास कार्य

अभ्यास-3 निम्नलिखित काव्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर दीजिए- 1*5=5

फिर से नहीं आता समय, जो एक बार चला गया ,

जग में बाधा रहित कब कौन काम हुआ भला।

बहती नदी सूखे अगर उस पार में इसके चलूँ ,

इस सोच में बैठा पुलिन पर, पार जा सकता भला?

किस रीति से क्या काम , कब करना बनाकर योजना ,

मन में आशा लिए प्रबल , दृढ़ वही जो बढ़ पाएगा ।

उसको मिलेगा तेज बल , अनुकूलता सब ओर से ,

वह कर्मयोगी , वीर, अनुपम साहसी सुख पाएगा ।

यह वीर भोग्या जो हृदय में बनी वसुधा सदा ,

करती रही आहवाहन है, युग वीर का , पुरुषत्व का।

कठिनाईयों में खोजकर पथ, ज्योति-पूरित जो करे,

विजयी वही होता धरणी-सूत वरन कर अमरत्व का ॥

1. समय की क्या विशेषता है ?
2. कौन सा मनुष्य पार नहीं जा सकता है ?
3. कौन विजयी होता है ?
4. किस प्रकार का मानव आगे बढ़ जाता है ?
5. इस पदयांश के लिए एक उचित शीर्षक दीजिए ?

अभ्यास-4 निम्नलिखित काव्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर दीजिए- 1*5=5

जिन्दगी वहीं तक नहीं , ध्वजा जिस जगह विगत युग ने गाड़ी,
मालूम किसी को नहीं, अनागत नर की दुविधाएँ सारी ।

सारा जीवन नप चुका , कहे जो वह दासता प्रचारक है ।

नर के विवेक का शत्रु , मनुज की मेधा का संघारक है ।

जो कहे, सोच मत स्वयं , बात जो कहूँ मानता चल उसको ।

नर की स्वतन्त्रता की मणि का .तू कह आराति प्रबल उसको ।

नर स्वतंत्र चिंतन से जो डरता , कदर्प , अविचारी है ।

बेडियाँ बुद्धि को देता , जुल्मी है , अत्याचारी है ।

क-‘ सारा जीवन नप चुका’ कहने वाले को दासता प्रचारक क्यों कहा गया है ?

ख-कवि आने वाली पीढी के नवयुवकों को क्या सलाह दे रहा है ?

ग-मनुष्य के स्वतंत्र चिंतनसे डरने वाले को क्या कहा गया है ?

घ-बुद्धि को बेडियाँ देने का क्या आशय है ?

ड-नर के विवेक का शत्रु किसे कहा गया है

प्रकरण 2 - गद्यांश

अभ्यास-1 निम्नलिखित गद्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर दीजिए ।

पशु और बालक भी जिनके साथ रहते हैं , उनसे पारच जाते हैं | यह परचना परिचय ही है | परिचय प्रेम का प्रवर्तक है | बिना परिचय प्रेम नहीं हो सकता | यदि देश प्रेम के लिए हृदय में जगह करनी है तो देश के स्वरूप से परिचित और अभ्यस्त हो जाइए| बाहर निकलिये तो आँखे खोलकर देखिये कि खेत कैसे लहलहा रहे हैं , नाले झाड़ियों के बीच कैसे बह रहे हैं , टेसू के फूलों से वनस्थली कैसे लाल हो रही है , कछारों में चौपायों के झुंड इधर – उधर चरते हैं चरवाहे तान लड़ा रहे हैं , अमराइयों के बीच गाँव झाँक रहे हैं ; उनमें घुसिए , देखिये तो क्या हो रहा है | जो मिले उनसे दो – दो बातें कीजिये , उनके साथ किसी पेड़ की छाया के नीचे घड़ी – आध –घड़ी बैठ जाइए और समझिए कि ये सब हमारे देश के हैं | इस प्रकार जब देश का रूप आपकी आँखों में समा जाएगा , आप उसके अंग प्रत्यंग से परिचित हो क-जाएँगे , तब आपके अंतःकरण में इस इच्छा का सचमुच उदय होगा कि वः कभी न छूटे , वः सदा हरा – भरा और फला – फूला रहे , उसके धनधान्य की वृद्धि हो , उसके सब प्राणी सुखीरहें |

पर आजकल इस प्रकार का परिचय बाबुओं की लज्जा का अक विषय हो रहा है | वे देश के स्वरूप से अनजान रहने या बनने में अपनी बड़ी शान समझते हैं | मैं अपने एक लखनवी दोस्त के साथ साँची का स्तूप देखने गया | वह स्तूप एक बहुत सुंदर छोटी – सी पहाड़ी के ऊपर है | नीचे छोटा – मोटा जंगल है , जिसमें महुए के पेड़ भी बहुत – से हैं | संयोग से उन दिनों वहाँ पुरातत्व विभाग का कैंप पड़ा हुआ था | रात हो जाने से उस दिन हम लोग स्तूप नहीं देख सके , सवेरे देखने का विचार करके नीचे उतर रहे थे | वसंत का समय था | महुए चारों ओर टपक रहे थे | मेरे मुँह से निकला – “महुओं की कैसी महक आ रही है |” इस पर लखनवी महाशय ने चट मुझे रोककर कहा – “यहाँ महुए – महुए का नाम न लीजिए , लोग देहाती समझेंगे |” मैं चुप हो रहा , समझ गया कि महुए का नाम जानने से बाबूपन में बड़ा भारी बट्टा लगता है | पीछे ध्यान आया कि यह वही लखनऊ है जहाँ कभी यह पूछने वाले भी थे कि गेहूँ का पेड़ आम के पेड़ से छोटा है या बड़ा |

- (क) “परिचय प्रेम का प्रवर्तक है “- का क्या आशय है ? 2
- (ख) लेखक ने किन बाबुओं पर व्यंग्य किया है ? 2
- (ग) लखनवी दोस्त ने लेखक को महुओं का नाम लेने से क्यों रोका ? 2
- (घ) पुरातत्व विभाग का क्या काम होता है ? 2
- (ड) प्रश्नवाचक वाक्य बनाइए – परिचय प्रेम का प्रवर्तक है | 1
- (च) पुरातत्व का संधि विच्छेद करें । 1
- (छ) देश प्रेम के उपायों पर चर्चा कीजिए । 2

(ज) गद्यांश में देश के किस स्वरूप का वर्णन किया गया है ?	2
(झ) गद्यांश का उपयुक्त शीर्षक लिखिए ।	1

अभ्यास -2 निम्नलिखित गद्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर दीजिए ।

यह संतोष और गर्व की बात है कि हमारा देश वैज्ञानिक और औद्योगिक क्षेत्र में आशातीत प्रगति कर रहा है। विश्व के समृद्ध अर्थ-व्यवस्था वाले देशों से टक्कर ले रहा है और उनसे आगे निकल जाना चाहता है, किंतु इस प्रगति के उजले पहलूके साथ एक धुँधला पहलू भी है जिससे हम छुटकारा चाहते हैं। वह है अनैतिकता का पहलू। यदि हमारे हृदय में सत्य, ईमानदारी, कर्मनिष्ठा और मानवीय भावनाएँ नहीं हैं; तो सारी प्रगति निरर्थक है। आज यह आम धारणा बन गई है कि बिना हथेली गरम किए कोई काम नहीं होगा। भ्रष्ट अधिकारियों और भ्रष्ट जनसेवकों को न तो समाज की चिंता है, और न ही देश की। भ्रष्टाचार और घोटाले के समाचारों से समाचार पत्र भरे रहते हैं। लोग मान बैठे हैं कि यही हमारा राष्ट्रीय चरित्र है। जबकि यह सच नहीं है। नैतिकता मरी नहीं है, परंतु लोगों में यह धारणा जरूर बन गई है कि जब बड़े लोग ही ऐसा करते हैं तो हम क्यों न करें? सबसे पहले इस सोच से मुक्ति पाना जरूरी है। इसके बाद भ्रष्टाचार और घोटाले से मुक्त समाज बनाने का संकल्प लेना है।

क- हमारे देश के लिए क्या गर्व की बात है ?	2
ख- हमारे देश की आशातीत प्रगति का धुँधला पहलू क्या है?	2
ग- देश की आशातीत प्रगति के लिए किन किन मानवीय मूल्यों की जरूरत है ?	2
घ- प्रत्यय अलग करें -ईमानदारी, नैतिकता	1
ङ- उपसर्ग अलग करें-प्रगति, अनैतिकता	1
च- उचित शीर्षक प्रदान करें।	1
छ- भ्रष्टाचार का अंत कैसे हो सकता है ?	2
ज- गद्यांश से मुहावरा छांट कर अर्थ लिखें।	2
झ- नैतिकता की धारणा स्पष्ट करें।	2

प्रकरण 3 - निबंध-लेखन

नमूना निबंध

भ्रष्टाचार : एक मानसिक गुलामी

प्रस्तावना : भ्रष्टाचार अर्थात् भ्रष्ट+आचार। भ्रष्ट यानी बुरा या बिगड़ा हुआ तथा आचार का मतलब है आचरण। अर्थात् भ्रष्टाचार का शाब्दिक अर्थ है वह आचरण जो किसी भी प्रकार से अनैतिक और अनुचित हो।

जब कोई व्यक्ति न्याय व्यवस्था के मान्य नियमों के विरुद्ध जाकर अपने स्वार्थ की पूर्ति के लिए गलत आचरण करने लगता है तो वह व्यक्ति भ्रष्टाचारी कहलाता है। आज भारत जैसे सोने की चिड़िया कहलाने वाले देश में भ्रष्टाचार अपनी जड़े फैला रहा है। आज भारत में ऐसे कई व्यक्ति मौजूद हैं जो भ्रष्टाचारी हैं।

आज पूरी दुनिया में भारत भ्रष्टाचार के मामले में 94वें स्थान पर है। भ्रष्टाचार के कई रंग-रूप हैं जैसे रिश्वत, काला-बाजारी, जान-बूझकर दाम बढ़ाना, पैसा लेकर काम करना, सस्ता सामान लाकर महंगा बेचना आदि। भ्रष्टाचार के कई कारण हैं। जानिए...

भ्रष्टाचार में मुख्य घूस यानी रिश्वत, चुनाव में धांधली, ब्लैकमेल करना, टैक्स चोरी, झूठी गवाही, झूठा मुकदमा, परीक्षा में नकल, परीक्षार्थी का गलत मूल्यांकन, हफ्ता वसूली, जबरन चंदा लेना, न्यायाधीशों द्वारा पक्षपातपूर्ण निर्णय, पैसे लेकर वोट देना, वोट के लिए पैसा और शराब आदि बांटना, पैसे लेकर रिपोर्ट छापना, अपने कार्यों को करवाने के लिए नकद राशि देना यह सब भ्रष्टाचार ही है।

1. भ्रष्टाचार के कारण :

- असंतोष - जब किसी को अभाव के कारण कष्ट होता है तो वह भ्रष्ट आचरण करने के लिए विवश हो जाता है।
- स्वार्थ और असमानता : असमानता, आर्थिक, सामाजिक या सम्मान, पद -प्रतिष्ठा के कारण भी व्यक्ति अपने आपको भ्रष्ट बना लेता है। हीनता और ईर्ष्या की भावना से शिकार हुआ व्यक्ति भ्रष्टाचार को अपनाने के लिए विवश हो जाता है। साथ ही रिश्वतखोरी, भाई-भतीजावाद आदि भी भ्रष्टाचार को जन्म देते हैं।
- भारत में बढ़ता भ्रष्टाचार : भ्रष्टाचार एक बीमारी की तरह है। आज भारत देश में भ्रष्टाचार तेजी से बढ़ रहा है। इसकी जड़े तेजी से फैल रही हैं। यदि समय रहते इसे नहीं रोका गया तो यह पूरे देश को अपनी चपेट में ले लेगा। भ्रष्टाचार का प्रभाव अत्यंत व्यापक है।

2. जीवन का कोई भी क्षेत्र इसके प्रभाव से मुक्त नहीं है। यदि हम इस वर्ष की ही बात करें तो ऐसे कई उदाहरण मौजूद हैं जो कि भ्रष्टाचार के बढ़ते प्रभाव को दर्शाते हैं। जैसे आईपील में खिलाड़ियों की स्पॉट फिक्सिंग, नौकरियों में अच्छी पोस्ट पाने की लालसा में कई लोग रिश्वत देने से भी नहीं चूकते हैं। आज भारत का हर तबका इस बीमारी से ग्रस्त है।

भ्रष्टाचार रोकने के उपाय :

1. यह एक संक्रामक रोग की तरह है। समाज में विभिन्न स्तरों पर फैले भ्रष्टाचार को रोकने के लिए कठोर दंड-व्यवस्था की जानी चाहिए। आज भ्रष्टाचार की स्थिति यह है कि व्यक्ति रिश्वत के मामले में पकड़ा जाता है और रिश्वत देकर ही छूट जाता है।
2. जब तक इस अपराध के लिए कोई कड़ा दंड नहीं दिया जाएगा तब तक यह बीमारी दीमक की तरह पूरे देश को खा जाएगी। लोगों को स्वयं में ईमानदारी विकसित करना होगी। आने वाली पीढ़ी तक सुआचरण के फायदे पहुंचाने होंगे。
 - a. उपसंहार : भ्रष्टाचार हमारे नैतिक जीवन मूल्यों पर सबसे बड़ा प्रहार है। भ्रष्टाचार से जुड़े लोग अपने स्वार्थ में अंधे होकर राष्ट्र का नाम बदनाम कर रहे हैं।
3. भ्रष्टाचार विरोधी दिवस : दुनियाभर में भ्रष्टाचार के खिलाफ लोगों में जागरूकता फैलाने के लिए ही 9 दिसंबर को 'अंतरराष्ट्रीय भ्रष्टाचार विरोधी दिवस' मनाया जाता है। संयुक्त राष्ट्र महासभा ने 31 अक्टूबर 2003 को एक प्रस्ताव पारित कर 'अंतरराष्ट्रीय भ्रष्टाचार विरोधी दिवस' मनाए जाने की

घोषणा की। भ्रष्टाचार के खिलाफ संपूर्ण राष्ट्र एवं दुनिया का इस जंग में शामिल होना एक शुभ घटना कही जा सकती है, क्योंकि भ्रष्टाचार आज किसी एक देश की नहीं, बल्कि संपूर्ण विश्व की समस्या है।

अभ्यास हेतु निबंध-

1. सांप्रदायिकता के प्रभाव
2. रोजगार परक शिक्षा-पद्धति: गुण व दोष
3. विज्ञान व कला
4. बदलते जीवन मूल्य
5. नई सदी: नया समाज
6. कामकाजी महिलाओं की समस्याएँ/ देश की प्रगति में महिलाओं का योगदान
7. राष्ट्र-निर्माण में युवा पीढ़ी का योगदान
8. इंटरनेट : सकारात्मक और नकारात्मक प्रभाव
9. पराधीन सपनेहुँ सुख नहीं
10. लोकतंत्र में मीडिया की भूमिका
11. प्रगति के पथ पर भारत
12. जन आंदोलन और सरकार
13. भ्रष्टाचार: समस्या और समाधान
14. हाय हाय रे मंहगाई

प्रकरण 4: रिपोर्ट

(i) रिपोर्ट/प्रतिवेदन

रिपोर्ट/प्रतिवेदन का सामान्य अर्थ: सूचनाओं के तथ्यपरक आदान-प्रदान को रिपोर्ट या रिपोर्टिंग कहते हैं। प्रतिवेदन इसका हिंदी रूपांतरण है। रिपोर्ट किसी संस्था, आयोजन या कार्यक्रम की तथ्यात्मक जानकारी है।

रिपोर्ट के गुण:

- तथ्यों की जानकारी स्पष्ट, सटीक, प्रामाणिक हो।
- संस्था/ विभाग के नाम का उल्लेख हो।
- अध्यक्ष आदि पदाधिकारियों के नाम।
- आयोजन-स्थल, दिनांक, दिन तथा समय।
- भाषा आलांकारिक या साहित्यिक न हो कर सूचनात्मक होनी चाहिए।
- सूचनाएँ अन्यपुरुष शैली में दी जाती हैं। मैं या हम का प्रयोग नहीं होता।
- संक्षिप्तता और क्रमिकता रिपोर्ट के गुण हैं।
- प्रतिवेदक या रिपोर्टर के हस्ताक्षर।

गत दस वर्षों से निर्दोष बच्चों के अपहरण और हत्या के मामले बढ़ते जा रहे हैं। सन 2005 में दिल्ली में 500 बच्चों का अपहरण हुआ और 198 की हत्या कर दी गई। 2008 में यह संख्या बढ़कर 734 तथा 298 हो गई। 2011 के आंकड़ें बताते हैं कि इस वर्ष 1079 बच्चे अपहरण के शिकार हुए, जबकि 345 बच्चों की हत्या कर दी गई।

ये आंकड़ें सरकारी हस्पताल या पुलिस रिपोर्ट पर आधारित हैं। न जाने और भी कितने बच्चे अपहरण और हत्या के शिकार हुए होंगे। शोध में यह तथ्य उभर कर आया है कि यह काम सुनियोजित होता है। पुलिस कि लापरवाही और लोभ के कारण अपराधी गिरोहों का पर्दाफाश नहीं हो पाता। इसलिए यह संख्या दिनोदिन बढ़ती जा रही है।

अभ्यास कार्य

निम्नलिखित विषयों पर रिपोर्ट तैयार कीजिए-

1. पूजा-स्थलों पर दर्शनार्थियों की अनियंत्रित भीड़
2. देश की महँगी होती व्यावसायिक शिक्षा
3. मतदान केन्द्र का दृश्य
4. आए दिन होती सड़क दुर्घटनाएँ
5. आकस्मिक बाढ़ से हुई जनधन की क्षति

प्रकरण 5: फीचर लेखन

समकालीन घटना तथा किसी भी क्षेत्र विशेष की विशिष्ट जानकारी के सचित्र तथा मोहक विवरण को फीचर कहते हैं। फीचर मनोरंजक ढंग से तथ्यों को प्रस्तुत करने की कला है। वस्तुतः फीचर मनोरंजन की उंगली थाम कर जानकारी परोसता है। इस प्रकार मानवीय रुचि के विषयों के साथ सीमित समाचार जब चटपटा लेख बन जाता है तो वह फीचर कहा जाता है। अर्थात्- “ज्ञान + मनोरंजन = फीचर”।

पियक्कड़ तोता :

संगत का असर आता है, फिर चाहे वह आदमी हो या तोता। ब्रिटेन में एक तोते को अपने मालिक की संगत में शराब की ऐसी लत लगी कि उसने घर वालों और पड़ोसियों का जीना बेहाल कर दिया। जब तोते को सुधारने के सारे हथकंडे फेल हो गए तो मजबूरन मालिक को ही शराब छोड़नी पड़ी। मार्क बेटोक्वियो ने अफ्रीकी प्रजाति का तोता मर्लिन पाला। मार्क यदा-कदा शराब पी लेते। गिलास में बची शराब मर्लिन चट कर जाता। धीरे-धीरे मर्लिन की तलब बढ़ने लगी। वह वक्त-बेवक्त शराब माँगने लगा।

अभ्यास कार्य

निम्नलिखित विषयों पर फीचरलिखिए:

- चुनावी वायदे
- महँगाई के बोझतले मजदूर
- वाहनों की बढ़ती संख्या
- वरिष्ठ नागरिकों के प्रति हमारा नजरिया
- किसान का एक दिन
- क्रांति के स्वप्न-द्रष्टा अब्दुलकलाम
- क्रिकेट का नया संस्करण ट्वेंटी-ट्वेंटी
- बेहतर संसाधन बन सकती है जनसंख्या

प्रकरण 6: रिपोर्ट लेखन

आलेख-लेखन हेतु महत्वपूर्ण बातें:

१. किसी विषय पर सर्वांगपूर्ण जानकारी जो तथ्यात्मक, विश्लेषणात्मक अथवा विचारात्मक हो आलेख कहलाती है |
२. आलेख का आकार संक्षिप्त होता है |
३. इसमें विचारों और तथ्यों की स्पष्टता रहती है, ये विचार क्रमबद्ध रूप में होने चाहिए |
४. विचार या तथ्य की पुनरावृत्ति न हो |
५. आलेख की शैली विवेचन, विश्लेषण अथवा विचार-प्रधान हो सकती है |
६. ज्वलंत मुद्दों, समस्याओं, अवसरों, चरित्र पर आलेख लिखे जा सकते हैं |
७. आलेख गंभीर अध्ययन पर आधारित प्रामाणिक रचना होती है |

राज्य का चर जिमकार्बेट नेशनल पार्क

जंगली जीवों की विभिन्न प्रजातियों को संरक्षण देने तथा उनकी संख्या को बढ़ाने के उद्देश्य से हिमालय की तराई से लगे उत्तराखंड के पौड़ी और नैनीताल जिले में भारतीय महाद्वीप के पहले राष्ट्रीय अभयारण्य की स्थापना प्रसिद्ध अंगरेजी लेखक जिम कार्बेट के नाम पर की गई | जिम कार्बेट नेशनल पार्क नैनीताल से एक सौ पन्द्रह किलोमीटर और दिल्ली से २९० किलोमीटर दूर है। यह अभयारण्य पाँच सौ इक्कीस किलोमीटर क्षेत्र में फैला है | नवम्बर से जून के बीच यहाँ घूमने-फिरने का सर्वोत्तम समय है |

यह अभयारण्य चार सौ से ग्यारह सौ मीटर की ऊँचाई पर है | ढिकाला इस पार्क का प्रमुख मैदानी स्थल है और कांडा सबसे ऊँचा स्थान है | जंगल, जानवर, पहाड़ और हरी-भरी वादियों के वरदान से जिमकार्बेट पार्क दुनिया के अनूठे पार्कों में है | रायल बंगाल टाइगर और एशियाई हाथी पसंदीदा घर है | यह एशिया का सबसे पहला संरक्षित जंगल है | राम गंगा नदी इसकी जीवन-धारा है | यहाँ एक सौ दस तरह के पेड़-पौधे, पचास तरह के स्तनधारी जीव, पच्चीस प्रजातियों के सरीसृप और छह सौ तरह के रंग-विरंगे पक्षी हैं | हिमालयन तेंदुआ, हिरन, भालू, जंगली कुत्ते, भेड़िये, बंदर, लंगूर, जंगली भैंसे जैसे जानवरों से यह जंगल आबाद है | हर वर्ष लाखों पर्यटक यहाँ आते हैं | शाल वृक्षों से घिरे लंबे-लंबे वन-पथ और हरे-भरे घास के मैदान इसके प्राकृतिक सौंदर्य में चार चाँद लगा देते हैं |

अभ्यास कार्य

निम्नलिखित विषयों पर आलेख लिखिए-

- बढ़ती आबादी : देश की बरबादी
- सांप्रदायिकसद्भावना
- कर्ज में डूबा किसान
- आतंकवाद की समस्या
- डॉक्टर हड़ताल पर, मरीज परेशान
- वर्तमान परीक्षा-प्रणाली
- बजट और बचत
- शक्ति, संयम और साहस
- रिश्वत का रोग
- सपना सच हो अपना

प्रकरण 7: पत्र-लेखन

विचारों, भावों, संदेशों एवं सूचनाओं के संप्रेषण के लिए पत्र सहज, सरल तथा पारंपरिक माध्यम है। पत्र अनेक प्रकार के हो सकते हैं, पर प्रायः परीक्षाओं में शिकायती-पत्र, आवेदन-पत्र तथा संपादक के नाम पत्र पूछे जाते हैं।

पत्र प्रारूप

सेवा में ,
संस्था प्रमुख
(प्रश्न-पत्र के अनुसार)

विषय-

महोदय;

निवेदन है कि ,

प्रश्न : अस्पताल के प्रबंधन पर संतोष व्यक्त करते हुए चिकित्सा-अधीक्षक को पत्र लिखिए ।

उत्तर

माननीय
चिकित्सा-अधीक्षक,
जिला अस्पताल
जनपद मेरठ, उत्तर प्रदेश।

विषय : अस्पताल के प्रबंधन पर संतोष व्यक्त करने के संदर्भ में -
मान्यवर,

इस पत्र के माध्यम से मैं आपके चिकित्सालय के सुप्रबंधन से प्रभावित हो कर आपको धन्यवाद दे रहा हूँ। गत सप्ताह मेरे पिता जी हृदय-आघात से पीड़ित होकर आपके यहाँ दाखिल हुए थे। आपके चिकित्सकों और सहयोगी स्टाफ ने जिस तत्परता, कर्तव्यनिष्ठा और ईमानदारी से उनकी देखभाल तथा चिकित्सा की उससे हम सभी परिवारी जन संतुष्ट हैं। हमारा विश्वास बढ़ा है। आपके चिकित्सालय का अनुशासन प्रशंसनीय है।
आशा है जब हम पुनर्परीक्षण हेतु आएँगे, तब भी वैसी ही सुव्यवस्था मिलेगी।
धन्यवाद सहित !

भवदीय
क ख ग
लाल कुर्ती
मेरठ, उत्तर प्रदेश

हस्ताक्षर:-
दिनांक :-

अभ्यास कार्य

अभ्यासार्थ प्रश्न:-

1. किसी दैनिक समाचार-पत्र के संपादक के नाम पत्र लिखिए जिसमें वृक्षों की कटाई को रोकने के लिए सरकार का ध्यान आकर्षित किया गया हो।
2. हिंसा-प्रधान फिल्मों को देख कर बालवर्ग पर पड़ने वाले दुष्प्रभाव का वर्णन करते हुए किसी दैनिक पत्र के संपादक के नाम पत्र लिखिए।

3. अनियमित डाक-वितरण की शिकायत करते हुए पोस्टमास्टर को पत्र लिखिए।
4. लिपिक पद हेतु विद्यालय के प्राचार्य को आवेदन-पत्र लिखिए।
5. अपने क्षेत्र में बिजली-संकट से उत्पन्न कठिनाइयों का वर्णन करते हुए अधिशासी अभियन्ता विद्युत-बोर्ड को पत्र लिखिए।

प्रकरण 7: जनसंचार माध्यम एवं अभिव्यक्ति

उत्तम अंक प्राप्त करने के लिए ध्यान देने योग्य बातें-

- अभिव्यक्ति और माध्यम से संबंधित प्रश्न विशेष रूप से तथ्यपरक होते हैं अतः उत्तर लिखते समय सही तथ्यों को ध्यान में रखें।
- इस भाग के अंतर्गत एक-एक अंक के कुल पाँच प्रश्न होंगे।
- उत्तर बिंदुवार लिखें, मुख्य बिंदु को सबसे पहले लिख दें।
- शुद्ध वर्तनी का ध्यान रखें।
- लेख साफ़-सुथरा एवम पठनीय हो।
- उत्तर में अनावश्यक बातें न लिखें।

ान तक

पहुँचना।

प्रश्न 2. : संचार से क्या अभिप्राय है?

उत्तर : संचार दो या दो से अधिक व्यक्तियों के बीच सूचनाओं, विचारों और भावनाओं का आदान-प्रदान है।

प्रश्न 3. : संचार और जनसंचार के विविध माध्यम कौन-कौन से हैं?

उत्तर : टेलीफोन, इंटरनेट, फ़ैक्स, समाचार-पत्र, रेडियो, टेलीविजन और सिनेमा आदि।

प्रश्न 5. : संचार के तत्त्व कौन-कौन से हैं?

उत्तर : स्रोत, संदेश, शोर, डीकोडिंग, फीडबैक आदि।

प्रश्न 6. : 'संचार' के प्रकार कौन-कौन से हैं?

उत्तर : मौखिक और अमौखिक संचार, अंतःवैयक्तिक संचार, अंतर-वैयक्तिक संचार, समूह, समूह संचार, जनसंचार आदि।

प्रश्न 7. : संचार प्रक्रिया की शुरुआत कब होती है?

उत्तर : जब स्रोत या संचारक एक उद्देश्य के साथ अपने किसी विचार, संदेश या भावना को किसी और तक पहुँचाना चाहता है तब संचार की शुरुआत होती है।

प्रश्न 8. : सफल संचार के लिए क्या आवश्यक है?

उत्तर : सफल संचार के लिए आवश्यक है कि संदेशग्रहीता भी भाषा यानी उस कोड से परिचित हो जिसमें अपना संदेश भेज रहे हैं।

प्रश्न 9. : 'डीकोडिंग' का क्या अर्थ है?

उत्तर : 'डीकोडिंग' का अर्थ है – प्राप्त संदेशों में निहित अर्थ को समझने की कोशिश।

प्रश्न 10. 'फीडबैक' से हमें क्या पता चलता है?

उत्तर : फीडबैक से हमें पता चलता है कि संचारक ने जिस अर्थ के साथ संदेश भेजा था, वह उसी अर्थ में प्राप्तकर्ता को मिला है।

प्रश्न 11. : 'शोर' से क्या अभिप्राय है?

उत्तर : संचार-प्रक्रिया में कई प्रकार की बाधाएँ आती हैं, इन बाधाओं को शोर कहते हैं।

प्रश्न 12. : सांकेतिक संचार किसे कहते हैं?

उत्तर : संकेतों द्वारा विचारों का आदान-प्रदान करना ही सांकेतिक संचार कहलाता है।

प्रश्न 13. : अंतर-वैयक्तिक संचार से आप क्या समझते हैं?

उत्तर : जब दो व्यक्ति आपस में आमने-सामने संचार करते हैं तो इसे अंतर-वैयक्तिक संचार कहते हैं।

प्रश्न 14. : साक्षात्कार में कौन-से कौशल की परख होती है?

उत्तर : साक्षात्कार में अंतर-वैयक्तिक कौशल की परख होती है।

प्रश्न 15. : जनसंचार की किसी एक विशेषता को लिखिए।

उत्तर : जनसंचार माध्यमों के जरिए प्रकाशित या प्रसारित संदेशों की प्रकृति सार्वजनिक होती है?

प्रश्न 16. : संचार के प्रमुख कार्य बताइए।

उत्तर : प्राप्ति, नियंत्रण, सूचना, अभिव्यक्ति, सामाजिक सम्पर्क तथा समस्या-समाधान प्रतिक्रिया आदि।

प्रश्न 17. : जनसंचार के प्रमुख प्रमुख कार्यों का उल्लेख कीजिए।

उत्तर : सूचना देना, शिक्षित करना, मनोरंजन करना, एजेंडा तय करना, निगरानी करना, तथा विचार-विमर्श के लिए मंच उपलब्ध कराना।

प्रश्न 18. : संपादकीय विभाग का क्या कार्य है?

उत्तर : खबरों, लेखों तथा फीचरों को व्यवस्थित ढंग से संपादकीय करने का कार्य संपादकीय विभाग का होता है?

प्रश्न 19. : उदंत मार्तण्ड का प्रकाशन कब और कहाँ हुआ ?

उत्तर : साप्ताहिक पत्र उदंत मार्तण्ड 1826 ई. में कोलकाता से जुगल किशोर के संपादकत्व में प्रकाशित हुआ।

प्रश्न 20. : भारत में पत्रकारिता की शुरुआत कब हुई?

उत्तर : भारत में पत्रकारिता की शुरुआत सन् 1780 ई में जेम्स ऑगस्ट हिक्की के 'बंगाल-गजल' से हुई।

प्रश्न 21. : आजादी-पूर्व के प्रमुख पत्रकारों के नाम बताइए।

उत्तर : गणेश शंकर विद्यार्थी, माखनलाल चतुर्वेदी, महावीर प्रसाद द्विवेदी, प्रतापनारायण मिश्र, शिवपूजन सहा, रामवृक्ष बेनीपुरी, बालमुकुन्द गुप्त आदि।

प्रश्न 22. आजादी पूर्व की कुछ प्रमुख पत्र-पत्रिकाओं के नाम बताइए।

उत्तर : केसरी, हिन्दुस्तान, सरस्वती, हंस, कर्मवीर, प्रताप, आज, विशाल भारत आदि।

प्रश्न 23. : रेडियो का आविष्कार कब और किसने किया?

उत्तर : सन् 1895 ई. में जी मार्कोनी ने।

प्रश्न 24 : सिनेमा का आविष्कार कब और किसने किया?

उत्तर : सन् 1883 ई. में थामस अल्वा एडीसन ने।

प्रश्न 25. : जनसंचार का नवीनतम लोकप्रिय साधन क्या है?

उत्तर : इन्टरनेट

प्रश्न 26. : प्रमुख स्टिंग ऑपरेशन कौन से हैं?

उत्तर : तहलका, ऑपरेशन दुर्योधन या चक्रव्यूह,

प्रश्न 27. : पत्रकारिता का मूल तत्व क्या है?

उत्तर : जिज्ञासा और समाचार व्यापक अर्थों में पत्रकारिता का मूल तत्व है।

प्रश्न 28: पत्रकारिता का सम्बन्ध किससे है?

उत्तर : सूचनाओं का संकलन एवं उनका संपादन कर पाठकों तक पहुँचाना है।

प्रश्न 29 : समाचार में कौन-से तत्व आवश्यक है?

उत्तर : नवीनता, जनरुचि, निकटता, प्रभाव,

प्रश्न 30. : संपादन में मुख्य रूप से क्या आवश्यक है?

उत्तर : तथ्यपरकता, वस्तुपरकता, निष्पक्षता तथा संतुलन ।

प्रश्न 31. : समाचार की परिभाषा लिखिए।

उत्तर : समाचार किसी भी ऐसी ताजा घटना, विचार या समस्या की रिपोर्ट है जिसमें अधिक से अधिक लोगों की रुचि हो, और जिसका अधिक से अधिक लोगों पर प्रभाव पड़ रहा हो।

प्रश्न 32. : संपादन का क्या अर्थ है?

उत्तर : किसी सामग्री की अशुद्धियों को दूर कर उसे पठनीय बनाना।

प्रश्न 33. : पत्रकार की बैसाखियाँ किसे कहा जाता है?

उत्तर : विश्वसनीयता, संतुलन, निष्पक्षता तथा स्पष्टता

प्रश्न 34. संपादकीय किसे कहा जाता है?

उत्तर : संपादक जिस पृष्ठ पर विभिन्न घटनाओं और समाचारों पर अपनी राय प्रकट करता है उसे संपादकीय कहते हैं।

प्रश्न 35. पहले पृष्ठ पर प्रकाशित होने वाले हस्ताक्षरित समाचार को क्या कहते हैं?

उत्तर : कार्टून कोना

प्रश्न 36. पत्रकारिता के प्रमुख प्रकार बताइए।

उत्तर : खोजपरक पत्रकारिता, विशेषीकृत पत्रकारिता, वॉचडॉग पत्रकारिता, एडवोकेसी पत्रकारिता, वैकल्पिक मीडिया।

प्रश्न 37. : खोजपरक पत्रकारिता से आप क्या समझते हैं?

उत्तर : ऐसी पत्रकारिता जिसमें गहराई से छानबीन करके ऐसे तथ्यों और सूचनाओं को सामने लाने की कोशिश की जाती है जिन्हें दबाने या छिपाने का प्रयास किया जा रहा हो।

प्रश्न 38. : वॉचडॉग पत्रकारिता से क्या आशय है?

उत्तर : किसी के सरकार के कामकाज पर निगाह रखते हुए किसी गड़बड़ी का पर्दाफाश करना वॉचडॉग पत्रकारिता कहलाती है।

प्रश्न 39. : एडवोकेसी पत्रकारिता क्या है?

उत्तर : किसी खास मुद्दे को उछालकर उसे पक्ष में जनमत बनाने का लगातार अभियान चलाना एडवोकेसी पत्रकारिता कहलाती है।

प्रश्न 40. : वैकल्पिक मीडिया से आप क्या समझते हैं?

उत्तर : जो मीडिया स्थापित व्यवस्था के विकल्प को सामने लाने और उसके अनुकूल वैकल्पिक सोच को अभिव्यक्त करता है, उसे वैकल्पिक मीडिया कहते हैं।

प्रश्न 41. : 'अखबार' शब्द मूल रूप से किस भाषा का शब्द है?

उत्तर : समाचार-पत्र को अरबी में अखबार कहते हैं। इसलिए ऐसा पत्र जिसमें खबरें ही खबरें हो, अखबार कहलाता है।

प्रश्न 42. : अग्रलेख से क्या आशय है?

उत्तर : एक ही संपादकीय स्तम्भ में दो या तीन संपादकीय लेख हों तो पहले को अग्रलेख व अन्य को संपादकीय टिप्पणियां कहते हैं।

प्रश्न 43. : एंकर का क्या अर्थ है? तथा उद्घोषक को हम किस अर्थ में लेते हैं?

उत्तर : किसी टीवी कार्यक्रम को संचालित करने वाला अभिनेता या अभिनेत्री। रेडियो कार्यक्रम शुरू होने से पूर्व कार्यक्रम संबंधी या अन्य आवश्यक घोषणाएँ करने वाला उद्घोषक कहलाता है।

प्रश्न 44. : कतरन (क्लिपिंग) किसे कहते हैं?

उत्तर : संपादकीय लेख, टिप्पणियाँ तैयार करने हेतु विभिन्न पत्र-पत्रिकाओं से काटकर रखी गई कतरनों को क्लिपिंग कहते हैं।

प्रश्न 45. : कवरेज को हम किस अर्थ में लेते हैं?

उत्तर : घटनास्थल पर पहुँचकर समाचारों का संकलन करना और उन्हें प्रकाशित करना कवरेज कहलाता है।

प्रश्न 46. : गजट को परिभाषित कीजिए।

उत्तर : वह सामयिक-पत्र जिसमें सरकारी सूचनाएँ प्रकाशित होती हैं

प्रश्न 47. पत्रकारिता में छः ककार क्या हैं?

उत्तर : पत्रकार क्लिपिंग ने समाचार संकलन के लिए पाँच डब्ल्यू व एक एच का सिद्धांत दिया, इसे ही हिन्दी में छः ककार का सिद्धांत कहते हैं। ये ककार हैं— कहाँ, कब, क्या, किसने, क्यों और कैसे।

प्रश्न 48. : टाइप के कितने अंग हैं?

उत्तर : टाइप के 10 अंग हैं— काउंटर, बॉडी, सेरिफ, फेस, बिअर्ड, शोल्डर, पिन, निक, गूव, फुट ।

प्रश्न 49.: टेलीप्रिंटर का कार्य क्या है?

उत्तर : विद्युत—चालित मशीन जिसकी सहायता से संवाद समितियों के समाचार, अखबार के कार्यालय तक मशीन पर चढ़े कागज पर स्वतः टाइप होकर पहुँचते हैं ।

प्रश्न 50. : 'डमी' शब्द की व्याख्या प्रस्तुत कीजिए ।

उत्तर : इसे ले—आउट भी कहते हैं, पत्र के पूरे आकार या छोटे आकार वाले कागज जिन पर समाचारों, चित्रों, विज्ञापनों की स्थिति की रूपरेखा दी जाती है ।

प्रश्न 51. : डेटलाइन किसे कहते हैं?

उत्तर : प्रत्येक समाचार के शीर्षक के बाद और इंट्रो से पहले उस समाचार का स्थान व तारीख दी जाती है, उसे डेटलाइन कहते हैं ।

प्रश्न 52. : तड़ित समाचार (फ्लैश) से आप क्या समझते हैं?

उत्तर : किसी विशेष समाचार का पूरा विवरण देने में देर लगने की स्थिति में उस समाचार का संक्षिप्त रूप, न्यूज एजेंसी , पत्र या रेडिया को दिया जाता है, इसे फ्लैश कहते हैं ।

प्रश्न 53. : पीत पत्रकारिता (यलो जर्नलिज्म) किसे कहते हैं?

उत्तर : कतिपय समाचार—पत्र सनसनीखेज खबरों और व्यक्ति—परक चरित्र—हनन जैसे समाचारों को अधिक महत्व देते हैं, ऐसी प्रवृत्ति को पीत पत्रकारिता कहते हैं ।

प्रश्न 54. : प्रिंट लाइन को परिभाषित कीजिए ।

उत्तर : प्रत्येक समाचार—पत्र या पत्रिका में संपादक, प्रकाशक और मुद्रक का नाम अनिवार्य रूप से प्रकाशित किया जाता है, इस विवरण को ही प्रिंट लाइन कहते हैं ।

प्रश्न 55. : 'फिलर' पर टिप्पणी कीजिए ।

उत्तर : वह छोटा—छोटा मैटर जो मेक—अप में खाली स्थान बचने पर उसे भरने के काम आता है ।

प्रश्न 56.: फीचर किसे कहते हैं?

उत्तर : किसी रोचक विषय पर मनोरंजक शैली में लिखा गया लेख फीचर कहलाता है ।

प्रश्न 57. : फॉलोअप क्या होता है?

उत्तर : गत दिवस के अधूरे समाचार की अगली और नवीन जानकारी का प्रस्तुतीकरण ही फॉलोअप है ।

प्रश्न 58. : वाइ—लाइन क्या है?

उत्तर : संवाद के ऊपर दिया जाने वाला संवाददाता का नाम।

प्रश्न 59. : रि—पंच के बारे में लिखिये।

उत्तर : किसी समाचार का भेजने वाले केन्द्र से पुनःप्रेषण।