

PRAYAG PUBLIC SCHOOL
Summer Vacation Holiday Homework (2026–27)
Class-12th

Subject: Political Science

Chapter 1: The End of Bipolarity

Answer the following questions.

1. What is meant by Bipolarity?
2. Name the two superpowers after World War II.
3. What was the Soviet system?
4. Who was Mikhail Gorbachev?
5. Expand CIS
6. Explain the causes of the disintegration of the Soviet Union.
7. Discuss the consequences of the end of bipolarity.
8. Write a note on Shock Therapy.
9. Explain the political and economic changes in post-Soviet republics
10. Analyze the factors responsible for the collapse of the Soviet Union.
11. Explain how the end of bipolarity changed world politics.

B. Map Work:

On the political map of Europe, locate and label the former Soviet republics.

C. Project Work:

Prepare a chart showing the timeline from the Cold War to the disintegration of the USSR.

Chapter 2: Contemporary Centres of Power

Answer the following questions.

1. What is the European Union ?
2. What is ASEAN?
3. Expand SAARC
4. Name any two emerging powers in world politics.
5. What is BRICS?
6. Explain the rise of China as an economic power.
7. Describe the role of the European Union in global politics.
8. Write the objectives of ASEAN.
9. Explain India's relations with contemporary centres of power.
10. Discuss the political and economic importance of China.
11. Evaluate the role of the European Union as a major centre of power.

:- Make a comparative table of EU, ASEAN, and SAARC.

B. Project Work:

Collect information on BRICS nations and prepare a presentation

Chapter 3: Contemporary South Asia

Answer the following questions

1. Name the countries included in South Asia.
2. What is SAARC?
3. What is democracy?
4. Name one political issue of Pakistan.
5. Which country in South Asia is known for monarchy transition?
6. Discuss the democratic developments in Nepal.
7. Explain ethnic conflict in Sri Lanka.
8. Write about India-Pakistan relations.
9. Explain the role of SAARC in regional cooperation.
10. Analyze major political developments in South Asia.
11. Evaluate India's role in South Asian politics.

B. Map Work:

Locate all SAARC nations on the map of South Asia.

C. Project Work:

Prepare a report on regional conflicts and cooperation in South Asia.

Chapter 4: International Organizations

Answer the following questions.

1. When was the United Nations established?
2. What is the Security Council?
3. Expand WHO
4. What is UNESCO?
5. Name any two UN agencies.
6. Explain the structure of the United Nations.
7. What are the functions of the Security Council?
8. Discuss the need for reform in the UN.
9. Explain India's claim for permanent membership in the Security Council.
10. Evaluate the role of the United Nations in maintaining peace.
11. Discuss the major challenges faced by international organizations.

B. Activity:

Prepare a chart of principal organs of the United Nations.

C. Project Work:

Make a case study on any one UN peacekeeping mission.

:- Creative Assignment Section:

:- Students must complete any two:

:- Poster on World Peace and United Nations

:- Essay on India's Foreign Policy

:- Scrapbook on Current International Events

:- PowerPoint/Chart on Major Global Organizations

Mathematics

Chapter 1: Relations

1. Let $A = \{1, 2, 3, 4\}$. Define a relation R on A by $R = \{(a, b) : a \text{ divides } b\}$. Check whether R is reflexive, symmetric and transitive.
2. Show that the relation R on the set of integers defined by aRb iff $a-b$ is divisible by 5 is an equivalence relation.
3. Find all equivalence classes of the relation $R = \{(a, b) : a-b \text{ is divisible by } 3\}$ on Z .
4. If $A = \{1, 2, 3\}$ and $B = \{a, b, c, d\}$, find the total number of relations from A to B and from B to A .
5. Let $A = \{1, 2, 3, 4\}$. Define $R = \{(1, 1), (2, 2), (3, 3), (4, 4), (1, 2), (2, 1)\}$. Determine whether R is an equivalence relation.
6. Show that the relation 'parallel to' in the set of all lines in a plane is an equivalence relation.
7. Find the number of reflexive relations on a set having 4 elements.
8. Find the number of symmetric relations on a set having 3 elements.
9. Find the number of equivalence relations possible on a set having 3 elements.
10. Let $A = \{1, 2, 3, 4, 5\}$. Define $R = \{(a, b) : a+b \text{ is even}\}$. Verify whether R is an equivalence relation.
11. Show that the relation $R = \{(a, b) : |a-b| < 2\}$ on integers is not transitive.
12. Let $A = \{1, 2, 3\}$. Find the inverse relation of $R = \{(1, 2), (2, 3), (3, 1)\}$ and represent both relations using arrow diagrams.
13. Find the domain, co-domain and range of the relation $R = \{(1, 2), (2, 4), (3, 6), (4, 8)\}$.
14. Define universal relation and identity relation with suitable examples and properties.
15. Explain the difference between equivalence relation and partial order relation with examples.
16. Find all ordered pairs in the Cartesian product $A \times B$ where $A = \{1, 2, 3\}$ and $B = \{4, 5, 6\}$, then define a relation from A to B .
17. Let $A = \{1, 2, 3, 4\}$. Define $R = \{(a, b) : a \leq b\}$. Verify whether R is reflexive, symmetric and transitive.
18. Show that the relation 'is congruent to modulo 4' is an equivalence relation.
19. Find the total number of transitive relations on a set containing 2 elements.
20. Explain the applications of relations in computer science and database management.

Chapter 2: Functions

1. Determine the domain and range of $f(x) = \sqrt{9-x^2}$.
2. Determine the domain of $f(x) = 1/\sqrt{x^2-5x+6}$.
3. Show that $f(x) = 3x+5$ is one-one and onto from R to R .
4. Check whether the function $f: N \rightarrow N$ defined by $f(x) = x^2$ is onto.
5. Find the inverse of the function $f(x) = (2x-3)/(x+4)$, $x \neq -4$.
6. Show that the composition of two one-one functions is one-one.
7. Show that the composition of two onto functions is onto.
8. Find $f \circ g$ and $g \circ f$ for $f(x) = x^2+1$ and $g(x) = 2x-1$.
9. Find the domain and range of $f(x) = |x-2|$.

10. Find the domain of $f(x)=\log(x^2-9)$.
11. Determine whether $f(x)=x^3-x$ is one-one on \mathbb{R} .
12. Find the inverse of $f(x)=x^3+1$ if it exists.
13. State and prove the condition for invertibility of a function.
14. Explain the difference between injective, surjective and bijective functions with examples.
15. Find the range of the function $f(x)=1/(1+x^2)$.
16. If $f(x)=2x+1$ and $g(x)=x^2-3$, find $f \circ g(x)$ and $g \circ f(x)$.
17. Find the domain of $f(x)=\sqrt{(x-1)/(x+2)}$.
18. Verify whether the greatest integer function is one-one or onto.
19. Find the inverse of the function $f(x)=5x-7$.
20. Explain real life applications of functions in economics and physics.

Chapter 3: Inverse Trigonometric Functions

1. Prove that $\sin^{-1}x + \cos^{-1}x = \pi/2$.
2. Prove that $\tan^{-1}x + \cot^{-1}x = \pi/2$ for $x > 0$.
3. Evaluate $\tan^{-1}1 + \tan^{-1}2 + \tan^{-1}3$.
4. Evaluate $\sin^{-1}(3/5) + \cos^{-1}(4/5)$.
5. Find the exact value of $\tan(\tan^{-1}x + \tan^{-1}y)$.
6. Prove that $\sec^{-1}x = \cos^{-1}(1/x)$, $x \geq 1$.
7. Simplify $\sin(\cos^{-1}x)$.
8. Simplify $\cos(\sin^{-1}x)$.
9. Find the principal value of $\cos^{-1}(-1/2)$.
10. Find the principal value of $\tan^{-1}(-\sqrt{3})$.
11. Evaluate $\sin^{-1}(1/\sqrt{2})$.
12. Prove that $2\tan^{-1}x = \sin^{-1}(2x/(1+x^2))$ for $|x| \leq 1$.
13. Express $\tan^{-1}(2/3) + \tan^{-1}(7/3)$ as a single angle.
14. Find the value of $\sin[2\cos^{-1}(3/5)]$.
15. Find the value of $\cos[2\sin^{-1}(4/5)]$.
16. Differentiate between principal values and general values in inverse trigonometric functions.
17. Find the domain and range of $\sec^{-1}x$.
18. Find the domain and range of $\operatorname{cosec}^{-1}x$.
19. Evaluate $\tan^{-1}1 + \tan^{-1}2 - \tan^{-1}3$.
20. Explain applications of inverse trigonometric functions in engineering.

Chapter 4: Matrices (Types, Addition and Subtraction)

1. Define different types of matrices with suitable examples.
2. Find the sum of matrices A and B where $A=[[2,3,4],[1,0,5],[7,8,9]]$ and $B=[[1,2,3],[4,5,6],[7,8,9]]$.
3. Subtract matrix B from A where $A=[[9,8,7],[6,5,4],[3,2,1]]$ and $B=[[1,1,1],[2,2,2],[3,3,3]]$.
4. Show that matrix addition is commutative.
5. Show that matrix addition is associative.
6. Find $A+B-C$ for the given matrices $A=[[1,2],[3,4]]$, $B=[[4,3],[2,1]]$, $C=[[5,5],[5,5]]$.
7. Determine whether the matrix $A=[[1,2],[2,1]]$ is symmetric.
8. Determine whether the matrix $A=[[0,2],[-2,0]]$ is skew symmetric.
9. Find the order and type of the matrix $[[1,0,0],[0,1,0],[0,0,1]]$.
10. If A and B are matrices of order 3×3 , explain the conditions under which $A+B$ is defined.
11. Find the additive identity for matrices and verify its property.
12. Find the additive inverse of the matrix $[[2,-3],[4,5]]$.
13. Explain why matrices of different orders cannot be added.
14. Find the sum of a row matrix and a column matrix wherever possible.
15. Show by example that matrix subtraction is not commutative.
16. Construct a diagonal matrix and a scalar matrix of order 4.
17. Find $A-B+B-A$ for suitable matrices and comment on the result.
18. Write short notes on square matrix, diagonal matrix and identity matrix.
19. Find the transpose of the matrix $[[1,2,3],[4,5,6]]$.
20. Explain applications of matrices in computer graphics and cryptography.

English Core

1. You are Rohini/Rehan. Your school KRM Senior Secondary School, Gurgaon (now Gurugram) organised a workshop on how to conserve energy. A number of CBSE schools participated in it. Many eminent personalities addressed the students. Write a report in 120-150 words for your school magazine.
2. A mock drill of earthquake was conducted in your school, SBV West Vinod Nagar. Write a report for school magazine giving the detailed report of the drill.
3. You are Deepak/Deepika, Secretary of Ahimsa Club, Parsva Public School, Delhi. On 2nd October, your school observed 'International Day for Peace and Non-violence, organising various activities such as visit to Raj Ghat, Charkha spinning, lectures by eminent Gandhians, etc. Write a report on the same in 120-150 words.
4. Your school has recently arranged a musical night in the school auditorium. Write a report in 120-150 words on this programme for your school magazine. You are Mahima/Mahesh, Cultural Secretary of Vasant Vihar Public School, Itarsi. Invent the details.
5. You are Aniket/Ankita. You participated in a career counselling programme organized by Dream Careers. You had the opportunity of listening to professionals from various fields like Food technology, Biometric Sciences, nanotechnology, media management etc. Write a report of the programme in 120-150 words
6. You are Tapan/Triпти, a student of H.P Public School. Students of two schools from Germany Visited your school as part of a cultural exchange programme. Students of your school put up a Cultural show to welcome them. Write a report in the programme for your school magazine in 120-150 words.
7. (i) How and why was M. Hamel dressed differently that day?
 - (ii) Why was Franz surprised by the school's atmosphere on that day?
 - (iii) Why was Little Franz scared to go to school that morning?
 - (iv) What were the usual sounds heard out at the street when school began?
 - (v) What was like a thunderclap to Little Franz?
 - (vi) What was M.Hamel's view on the French language?
8. (i) What were the poet's feelings at the airport? How did she hide them?
 - (ii) The poem talks of a commonplace experience which has deep significance. Comment.
 - (iii) What familiar ache and childhood fear did Kamala Das feel?
 - (iv) Why are the young trees described as 'sprinting in the poem 'My Mother at Sixty- six'?
 - (v) What did Kamala Das think when she looked at her mother?
 - (vi) Why does Kamala Das compare her mother to a late winter's moon?

Economics

1. Explain the state of the Indian economy at the time of independence. Discuss its main features and challenges.
2. Describe the condition of Indian agriculture on the eve of independence. What were the major problems faced by the agricultural sector?
3. Examine the condition of Indian industries during British rule. Why was industrial development slow before independence?
4. Discuss the occupational structure of India on the eve of independence. How did it reflect backwardness in the economy?
5. Explain the condition of infrastructure in India at the time of independence. How did British policies affect its development?
6. Analyse the impact of British colonial rule on Indian economic development. How did it lead to economic stagnation?
7. Describe the demographic condition of India on the eve of independence. What were the major indicators of poor development?
8. What was the condition of foreign trade during British rule? Explain how trade policies served British interests.
9. Discuss the problem of partition and its economic effects on India at the time of independence.
10. Evaluate the positive and negative impacts of British rule on the Indian economy. Was there any benefit despite overall exploitation?

Explain the meaning and importance of economic development in India. Discuss its objectives and significance for the nation.

Describe the main features of the Indian economy as a developing economy. Explain with suitable examples.

Discuss the major goals of Indian economic development. How do growth, modernization, self-reliance, and equity contribute to development?

Explain the need for economic planning in India after independence. What were its major objectives?

Analyse the challenges faced by the Indian economy in the process of development. Discuss poverty, unemployment, population growth, and inequality.

SOURCE BASED QUESTIONS

1. Agriculture under British Rule

Source: "At the time of independence, nearly 70% of India's population was dependent on agriculture, but productivity remained very low due to outdated technology and poor irrigation facilities."

- a) What percentage of people depended on agriculture? b) Why was agricultural productivity low?
c) Mention two problems faced by Indian agriculture.

2. Industrial Backwardness

Source:

“The colonial government followed policies that discouraged modern industrialisation in India and promoted British manufactured goods.”

- a) Why was industrial growth slow? b) Which goods were promoted by the British?
c) How did this affect Indian industries?

3. Occupational Structure

Source:

“The occupational structure of India showed excessive dependence on agriculture, while manufacturing and services employed very few people.”

- a) Which sector employed most people? b) What does this indicate about the economy?
c) Why was this structure considered backward?

4. Infrastructure Development

Source:

“Railways, ports, and roads were developed mainly to serve British economic interests rather than the welfare of Indians.”

- a) Why did the British develop railways? b) Did infrastructure benefit Indians fully?
c) Name two infrastructure facilities.

5. Foreign Trade

Source:

“India became an exporter of raw materials and an importer of finished British products during colonial rule.”

- a) What did India export? b) What did India import? c) How did this affect Indian industries?

6. Demographic Condition

Source:

“At independence, India had a high birth rate, high death rate, and low life expectancy of about 32 years.”

- a) What was the life expectancy? b) What does high death rate indicate? c) Mention two causes of poor health conditions.

7. Partition and Economy

Source:

“The partition of India in 1947 divided important agricultural and industrial resources between India and Pakistan.”

- a) In which year did partition take place? b) What resources were affected?
c) How did partition impact India’s economy?

8. Colonial Exploitation

Source:

“The British used India as a source of cheap raw materials and a market for British finished goods.”

- a) How was India exploited? b) What was Britain’s main economic objective? c) What was the impact on Indian producers?

9. Poverty and Unemployment

Source:

“On the eve of independence, widespread poverty and unemployment were major economic challenges.”

- a) Name two major challenges. b) Why was unemployment high? c) How did poverty affect development?

10. State of the Economy

Source:

“After almost two centuries of British rule, the Indian economy was underdeveloped, stagnant, and dependent.”

- a) How long did British rule last? b) How was the economy described? c) What were the major weaknesses of the economy?

National income

1. Calculate GDP at Market Price if

Private Final Consumption Expenditure = ₹500 crore

Government Final Consumption Expenditure = ₹200 crore

Gross Domestic Capital Formation = ₹150 crore

Net Exports = ₹50 crore

2. Calculate Net Domestic Product at Factor Cost (NDPFC) if

GDPMP = ₹1000 crore

Depreciation = ₹100 crore

Net Indirect Taxes = ₹80 crore

3. Calculate Gross National Product at Market Price (GNPMP) if

GDPMP = ₹1200 crore

Net Factor Income from Abroad = ₹50 crore

4. Calculate National Income (NNPFC) if

GNPMP = ₹1500 crore

Depreciation = ₹100 crore

Net Indirect Taxes = ₹120 crore

5. Calculate Personal Income if

National Income = ₹2000 crore

Corporate Tax = ₹150 crore

Undistributed Profits = ₹100 crore

Transfer Payments = ₹200 crore

6. Calculate Disposable Personal Income if

Personal Income = ₹1800 crore

Personal Direct Taxes = ₹250 crore

7. Calculate Net National Product at Market Price (NNPMP) if

GNPMP = ₹2500 crore

Depreciation = ₹200 crore

8. Calculate GDP at Factor Cost if

GDPMP = ₹3000 crore

Net Indirect Taxes = ₹250 crore

9. Calculate National Income using Income Method if

Compensation of Employees = ₹800 crore

Rent = ₹200 crore

Interest = ₹150 crore

Profit = ₹300 crore

Mixed Income = ₹250 crore

10. Calculate National Income using Expenditure Method if

Consumption Expenditure = ₹1000 crore

Government Expenditure = ₹400 crore

Investment = ₹500 crore

Net Exports = ₹100 crore

Depreciation = ₹150 crore

Net Indirect Taxes = ₹200 crore

Business studies

SECTION A – CASE STUDY BASED QUESTIONS

Q1. A garment company noticed that workers were taking excessive time to complete stitching work. The manager introduced specialization, proper division of work, and scientific methods of production. Productivity increased significantly within two months.

(a) Identify the management principle applied here. (b) Name the thinker associated with this principle.

(c) Explain any two benefits of this principle in modern organizations.

Q2. "FreshKart Ltd." launched an online grocery platform. Before expansion, the company studied customer preferences, government taxation policies, inflation rate, and competitors' pricing strategies.

(a) Which feature of Business Environment is highlighted above? (b) Explain how business environment helps in identifying opportunities and threats. (c) State two dimensions of business environment involved here.

Q3. A school management committee prepared detailed plans for annual functions, sports activities, budget allocation, and teacher training before the academic session started.

(a) Which management function is being discussed? (b) Explain any four importance of this function.

(c) Why is this function considered "forward-looking"?

Q4. The production manager of a company always blamed workers for low output. However, after inspection it was found that machines were outdated and raw materials were delayed.

(a) Which principle of management was violated? (b) Explain the importance of harmony, not discord.

(c) State any two values violated by the manager.

Q5. A company manufacturing electric vehicles regularly modifies its strategies according to government subsidy schemes, environmental laws, and technological changes.

(a) Which dimension of business environment is highlighted? (b) Why is business environment considered dynamic?

(c) Explain any two impacts of government policy changes on business and industry.

SECTION B – COMPETENCY & APPLICATION QUESTIONS

- Q6. Differentiate between 'Effectiveness' and 'Efficiency' with suitable examples from business organizations.
- Q7. "Management is both a science and an art." Justify this statement with logical arguments.
- Q8. Explain the following principles of management with one practical example each:
(a) Unity of Direction (b) Scalar Chain (c) Equity (d) Espirit de Corps
- Q9. State any four characteristics of planning and explain them briefly.
- Q10. Why are principles of management called flexible guidelines and not rigid rules? Explain with examples.
- Q11. Explain how planning reduces risks in business organizations.
- Q12. A company introduced strict supervision and excessive penalties for employees. Gradually, employee morale started decreasing.
(a) Which principle of management should the company focus on? (b) Suggest any two corrective measures.
(c) What values should management promote?
- Q13. Explain any five reasons why management is considered important for every organization.
- Q14. Discuss any four limitations of planning.
- Q15. How does business environment help a business firm in improving performance and continuous growth?

SECTION C – HIGHER ORDER THINKING QUESTIONS (HOTS)

- Q16. "Planning is useless in a rapidly changing business environment." Do you agree? Give reasons in support of your answer.
- Q17. A manager follows all formal procedures but ignores employee emotions and motivation. Will the organization be successful in the long run? Explain with reasons.
- Q18. How can principles of management increase both efficiency and social responsibility in an organization?
- Q19. "Coordination is the essence of management." Explain this statement with suitable examples.
- Q20. Suppose government suddenly increases GST rates on luxury goods. Explain the possible impact on producers, consumers, and retailers.

SECTION D – CBSE CASE STUDIES

- Q21. "GreenLife Pvt. Ltd." manufactures eco-friendly bottles. The company planned to launch a new product in metro cities. Managers fixed targets, estimated budgets, selected advertising methods, and identified possible market risks before launch.
(a) Identify the management function involved. (b) State any three features of this function.
(c) Explain how this function promotes innovative ideas and decision-making.
- Q22. A factory manager observed that employees were frequently changing jobs due to dissatisfaction. To solve the issue, management increased salaries, introduced fair promotion policies, and improved workplace relationships.
(a) Which principle of Fayol is related to stability of employees? (b) Explain the principle briefly.
(c) How does employee stability improve organizational performance?
- Q23. "SmartTech Ltd." imports electronic parts from different countries. Due to international conflicts and inflation, the company faced rising costs and supply shortages.
(a) Identify the dimensions of business environment affecting the company.
(b) Explain any two features of business environment highlighted above.
(c) Suggest two ways through which the company can respond effectively.
- Q24. A company planned its sales targets assuming constant demand. However, market trends changed suddenly due to technological advancement, making the plans ineffective.
(a) Which limitation of planning is highlighted? (b) Explain any two more limitations of planning.
(c) Suggest measures to make planning more effective in dynamic conditions.
- Q25. Read the following statement carefully:
"Good management does not mean only achieving profits. It also means maintaining coordination, employee satisfaction, adaptability, and social responsibility."
On the basis of the above statement:
(a) Explain any two objectives of management. (b) How does coordination help in achieving organizational goals?
(c) Explain the role of management in society with suitable examples.

ACTIVITY TASK (COMPULSORY)

Prepare a project file (40-50 pages) on any one topic:

Which is prescribed in the syllabus of class 12th by cbse

Project Must Include:

Cover Page

Index, Introduction, Main Content, Diagrams/Pictures, Real-life Examples, Conclusion, Bibliography

SECTION A – CASE STUDY BASED QUESTIONS

Q1. A school organized an inter-school basketball tournament. Different committees such as finance committee, boarding and lodging committee, transport committee, and publicity committee were formed to ensure smooth conduct of the event.

(a) Which concept of sports management is highlighted here? (b) Explain the role of any two committees in organizing sports events. (c) Why is proper planning important before organizing tournaments?

Q2. A 14-year-old athlete was showing excellent performance in athletics. However, due to excessive pressure from parents and coaches, the child started facing anxiety and loss of confidence.

(a) Which psychological issue is highlighted in the case? (b) Explain any three disadvantages of excessive competition among children. (c) Suggest two measures to improve the child's mental well-being.

Q3. A yoga instructor advised patients suffering from obesity and hypertension to practice Tadasana, Bhujangasana, and Pranayama regularly along with dietary control.

(a) Name the lifestyle diseases mentioned above. (b) Explain how yoga helps in preventing lifestyle diseases. (c) Describe any two benefits of Pranayama.

Q4. During a women's football championship, organizers noticed that female participation was lower than expected because many parents believed sports were unsuitable for girls.

(a) Which social issue is reflected here? (b) Explain the importance of women participation in sports. (c) Suggest any two measures to encourage women participation in sports.

Q5. A school planned a marathon event but failed to arrange medical facilities and water stations. Several participants faced dehydration and health issues during the race.

(a) Which committee failed in its responsibilities? (b) Explain the importance of first aid and medical arrangements in sports events. (c) Mention any two precautions necessary during endurance events.

SECTION B – APPLICATION & COMPETENCY QUESTIONS

Q6. Differentiate between Intramural and Extramural tournaments with suitable examples.

Q7. Explain the objectives of organizing sports events in educational institutions.

Q8. Describe the procedure of conducting a Knock-out Tournament with suitable examples.

Q9. Explain any four common postural deformities among children and corrective measures for each.

Q10. Why are sports important for children's physical and psychological development? Explain.

Q11. Discuss the role of physical activities in the empowerment of women.

Q12. Explain any four myths related to women's participation in sports.

Q13. Describe the effects of obesity on health and physical fitness.

Q14. Explain the procedure and benefits of any four asanas used for prevention of diabetes.

Q15. What are the causes of lifestyle diseases among modern youth? Explain briefly.

SECTION C – HIGHER ORDER THINKING QUESTIONS (HOTS)

Q16. "Yoga is more effective as prevention rather than cure." Do you agree? Justify your answer with suitable examples.

Q17. A sports event can fail even if talented players participate in it. Explain this statement in the context of sports management.

Q18. How can schools promote equal opportunities for girls in sports despite social barriers?

Q19. "Healthy children become productive citizens." Explain the role of physical education in nation building.

Q20. Modern technology has reduced physical activity among children. Analyze the impact of this trend on health and sports participation.

SECTION D – CBSE CASE STUDIES

Q21. "FitLife School" organized a week-long yoga camp for students suffering from stress, obesity, and poor concentration. The yoga teacher included meditation, pranayama, and different asanas in the daily schedule.

(a) Identify any two lifestyle problems mentioned above.

(b) Explain how meditation helps students.

(c) Describe any two asanas beneficial for stress management.

Q22. During annual sports day preparation, the organizing committee faced problems such as delayed sponsorship, poor publicity, and transportation issues for participants.

- (a) Identify the committees responsible for these tasks. (b) Explain any three functions of the publicity committee.
(c) Why is coordination among committees essential for successful sports events?

Q23. A child spends most of the day using mobile phones and playing video games. Gradually, the child developed obesity and poor posture.

- (a) Identify the postural deformity and health issue involved. (b) Explain any three harmful effects of sedentary lifestyle.

(c) Suggest suitable physical activities and yoga practices for improvement.

Q24. A female boxer won an international medal despite facing financial difficulties and social criticism during her training years.

- (a) Which values are reflected through her achievement? (b) Explain the role of sports in women empowerment.
(c) Mention any two famous Indian sportswomen who inspired society through their achievements.

Q25. Read the following statement carefully:

“Physical Education is not limited to winning medals; it develops discipline, health, leadership, confidence, and social values among students.”

On the basis of the above statement:

- (a) Explain any two aims of Physical Education. (b) How do sports develop leadership qualities among students?
(c) Explain the social values developed through participation in sports.

Accountancy

1	Jain Ltd purchased machinery costing ₹ 10,00,000 from Ayer Ltd. 50% of the payment was made by cheque and for the remaining 50% the company issued Equity Shares of ₹ 100 each at a premium of 25%. Calculate amount paid through Bank draft. a) 50,00,000 b) 50,000 c) 4,00,000 d) 5,00,000
2	In case of private placement of shares, to raise the amount of capital, a company: a) Does not invite the public b) Invites the public through prospectus c) Invite the public through advertisement d) invites the public through memorandum of association
3	HR Limited issued 10,000 equity shares @ ₹ 10 each at 10% premium. All shares were subscribed and amount was received. Identify the amount to be transferred to Securities Premium Reserve A/c a) ₹ 9000 b) ₹ 1,00,000 c) ₹ 10,000 d) ₹ 1000
4	Issue of shares at a price more than its face value is called: a) Issue at a Profit b) Issue at a Discount c) Issue at a Loss d) Issue at a Premium
5	If a company purchases any fixed asset or a running business and makes payment to the vendor in form of issue of shares in place of cash it is called _____. a) issue of shares in form of assets b) private placement of shares c) issue of shares for cash d) issue of shares other than cash
6	The minimum share application money is: a) 5% of nominal value of shares b) 10% of nominal value of shares c) Rs. 5 per share d) none of the above
7	Ankit Ltd. purchased the business of Balwant Ltd. for ₹ 6,75,000 payable in fully paid shares of ₹ 10 each at a premium of 25%. Number of shares to be issued by Ankit Ltd. will be a) 67,500 b) 54,000 c) Nil d) 6,75,000
8	Bharat Lamp Ltd. issued 30,000 fully paid - up shares of ₹ 100 each for purchase of the following assets and liabilities from Sharma & Co Plant ₹ 7,00,000 Stock - in - Trade ₹ 9,00,000 Land and Building ₹ 12,00,000 Sundry Creditors ₹ 2,00,000. Calculate the amount of Goodwill. a) There is no Goodwill b) 4,00,000 c) 40,00,000 d) 40,000
9	Girish Limited issued 2,000 Equity Shares of ₹ 100 each as fully paid - up in consideration of the purchase of Plant and Machinery worth ₹ 2,00,000. What entry will be recorded in company's Journal? a) Vendor's A/c Dr. and Plant and Machinery A/c Cr. with 2,00,000 b) Vendor's A/c Dr. and Share Capital A/c Cr. With 2,00,000 c) Vendor's A/c Dr. and Share Capital A/c Cr. With 1,50,000 d) Plant and Machinery A/c Dr. and Share Capital A/c Cr. with 2,00,000.
10	4,000 Equity Shares of ₹ 10 each were issued at 8% premium to the promoters of a company for their services. Goodwill Account/incorporation Cost Account will be debited with? a) Securities Premium Account b) Share Capital Account c) Cash Account d) 43,200
11	Neema Toys invited applications for issuing 2,00,000 shares of ₹ 10 each at par. The amount was payable as follows:

	<p>On Application ₹ 4 On Allotment ₹ 3 On First and Final Call ₹ 3</p> <p>Applications were received for 2,40,000 shares. Applications for 10,000 shares were rejected and pro - rata allotment was made to the remaining applicants. All calls were made and were duly received except first and final call from a shareholder who applied for 6,900 shares and was allotted shares on pro - rata basis. His shares were forfeited. Amount Credited to Share Forfeiture Account will be: a) ₹ 48,300 b) ₹ 42,000 c) ₹ 45,600 d) ₹ 38,400</p>
12	<p>At the time of forfeiture of shares, with what amount share capital account will be debited, if shares of Rs.20 on which Rs.16 called and Rs.12 is paid and is forfeited? a) 12 b) 16 c) 20 d) 08</p>
13	<p>X Ltd. invited applications for issuing 2,00,000 shares of ₹ 100 each at a premium of ₹ 20 per share. The amount was payable as follows: On Application - ₹ 30 (including premium) On Allotment - ₹ 50 On First and Final Call - ₹ 40</p> <p>Applications were received for 3,00,000 shares and pro - rata allotment was made to all the applicants. All calls were made and were duly received except allotment and first and final call from Tara who had applied for 2,400 shares. Her shares were forfeited. Amount Credited to Share Forfeited Account will be: a) ₹ 40,000 b) ₹ 48,000 c) ₹ 72,000 d) ₹ 16,000</p>
14	<p>Meeta Ltd. invited applications for issuing 30,000 equity shares of ₹ 10 each. Applications for 29,500 shares were received. Allotment was made in full. A shareholder holding 100 shares failed to pay the first call of ₹ 2 per share. His shares were forfeited. The second call of ₹ 3 per share was not yet made. The amount debited to share capital account, on the forfeiture of shares will be: a) ₹ 3,00,000 b) ₹ 2,95,000 c) ₹ 300 d) ₹ 700</p>
15	<p>2000 shares of ₹ 10 each issued at a premium of ₹ 2 per share, were forfeited for non payment of ₹ 2 per share on final call. Share Capital Account will be Debited with (At the time of forfeiture): a) 20000 b) 4000 c) 24000 d) 16000</p>
16	<p>A share of ₹ 10 each, issued at ₹ 4 premium out of which ₹ 7 (including ₹ 1 premium) was called - up and paid - up. The uncalled Capital will be _____. a) ₹ 4per share b) ₹ 3per share c) ₹ 7 per share d) ₹ 8per share</p>
17	<p>Shakshi Ltd. invited applications of 45,000 Equity Shares of ₹ 10 each at a Premium of 40%. Company received applications for 60,000 shares. Amount payable as follows: on Application ₹ 7 (including premium of ₹ 2), on Allotment ₹ 3 (including premium of ₹ 1), Balance on first and final call. One shareholder Mansi who applied for 600 shares failed to pay allotment and first and final call money. Amount of share forfeiture (credited at the time of forfeiture of shares): a) 3,150 b) 2,250 c) 3,300 d) 4,200</p>
18	<p>X Ltd. forfeited 100 shares of ₹ 10 each, ₹ 8 called - up for non - payment of allotment money of ₹ 5 per share (including premium of ₹ 2 per share). Out of these, 70 shares were reissued to Ashok as ₹ 8 called - up, for ₹ 10 per share. On forfeiture, Share Forfeiture Account will be: a) Credited by ₹ 700 b) Debited by ₹ 200 c) Credited by ₹ 500 d) Debited by ₹ 500</p>
19	<p>Lexa Ltd. issued 50,000 equity shares of ₹ 10 each at a premium of ₹ 2 per share. The amount was payable as follows: On application and allotment - ₹ 7 per share (including premium) On first and final call - Balance</p> <p>The issue was fully subscribed. All the money was duly received except the first and final call on 1,000 equity shares. These shares were forfeited. On forfeiture of these shares Calls in Arrears Account will be: a) debited by ₹ 7,000 b) credited by ₹ 7,000 c) debited by ₹ 5,000 d) credited by ₹ 5,000</p>
20	<p>200 equity shares of ₹ 10 each issued at par were forfeited for non - payment of first call of ₹ 3 per share. Final call of ₹ 2 per share was not yet called. By which amount the share capital will be debited on forfeiture? a) ₹ 1,600 b) ₹ 2,200 c) ₹ 1,000 d) ₹ 2,000</p>
21	<p>Naveen, a Director of Navo Jagson Ltd., proposed in a board meeting that to inculcate the habit of savings among people he wanted to bring a special issue of shares. His proposal was accepted by the company.</p> <p>The company issued 40,000 equity shares of ₹ 100 each. The share money per share was payable as: On application - ₹ 30 On allotment - ₹ 50 On first and final call - ₹ 20</p> <p>Rohit, a farmer holding 80 shares could not pay his call money on time. Neeraj another farmer holding 50 shares, paid the call money also with allotment.</p> <p>Rohit paid the amount due from him after four months explaining the reason for delay; the company did not charge any interest from him.</p>

	Calculate the amount received by the company on allotment.						
22	<p>On 1st April, 2023, Laxmi Ltd. was formed with an authorized capital of ₹ 60,00,000 divided into 3,00,000 equity shares of ₹ 20 each. Out of these, 50,000 shares were issued to the vendors as fully paid up for purchase of office premises. The director offered 1,20,000 shares to the public and called up ₹ 10 per share and received the entire called up amount on these shares.</p> <p>Show the share capital in the Balance Sheet of the company as per Schedule - III and also prepare notes to accounts.</p>						
23	Great Marketing Ltd. issued 2,50,000 Equity Shares of ₹ 10 each to public at par for subscription, amount being payable as application money. Pass necessary Journal entries in the books of the company.						
24	<p>V Ltd. Issued 20,000 Equity shares of Rs. 10 each at a premium of Rs. 3 payable as follows:</p> <p>On Application Rs. 4 On Allotment Rs. 5 (including Premium) On First Call Rs. 2 On Final Call Rs. 2</p> <p>All shares were duly subscribed and all money duly received. Pass necessary Journal Entries.</p>						
25	X Ltd. invited application for 10,000 shares of the value of Rs. 10 each. The amount is payable as Rs. 2 on application and Rs. 5 on allotment and balance on First and Final Call. The whole of the above issue was applied and cash duly received. Give Journal entries for the above transaction.						
26	<p>Mahindra Limited issued a prospectus inviting applications for 60,000 shares of ₹ 10 each at a premium of 30% payable as follows: On Application ₹ 3.50; On Allotment ₹ 5.50 (including premium): On First Call ₹ 2 and on Second Call ₹ 2.</p> <p>Applications were received for 95,000 shares and allotment was made pro - rata to applicants of 80,000 shares. Money over - paid on applications were employed on account of sums due on allotment.</p> <p>X, to whom 1,500 shares were allotted failed to pay the allotment money and on his subsequent failure to pay the First Call his shares were forfeited. Y, the holder of 2,400 shares failed to pay the two calls and his shares were forfeited after the Second Call. Of the shares forfeited, 3,000 shares were sold to Z as fully paid, Z paying ₹ 8.50 per share, the whole of Y's share being included.</p> <p>Give journal entries and prepare Bank Account.</p>						
27	<p>Khatri Ltd. issued a prospectus inviting applications for 80,000 equity shares of ₹ 10 each payable as follows:</p> <p>₹ 2 on application ₹ 3 on allotment ₹ 2 on first call ₹ 3 on final call</p> <p>Applications were received for 1,20,000 equity shares. It was decided to adjust the excess amount received on account of over subscription till allotment only. Hence allotment was made as under:</p> <table border="1" data-bbox="126 1161 597 1283"> <tr> <td>To applicants for 20,000 shares</td> <td>in full</td> </tr> <tr> <td>To applicants for 40,000 shares</td> <td>10,000 shares</td> </tr> <tr> <td>To applicants for 60,000 shares</td> <td>50,000 shares</td> </tr> </table> <p>Allotment was made and all shareholders except Gayatri, who had applied for 2,400 shares out of the group (iii), could not pay allotment money. Her shares were forfeited immediately after allotment. Another shareholder Kiran, who was allotted 500 shares out of group (ii), failed to pay first call. 50% of Gayatri's shares were reissued to Sunny as ₹ 7 paid up for payment of ₹ 9 per share.</p> <p>Pass necessary journal entries in the books of Khatri Ltd. for the above transactions by opening calls in arrears and calls in advance account wherever necessary.</p>	To applicants for 20,000 shares	in full	To applicants for 40,000 shares	10,000 shares	To applicants for 60,000 shares	50,000 shares
To applicants for 20,000 shares	in full						
To applicants for 40,000 shares	10,000 shares						
To applicants for 60,000 shares	50,000 shares						
28	The HND Ltd. had a total subscribed capital of ₹ 10,00,000 in Equity Shares of ₹ 10 each of which ₹ 7.50 were called - up. A final call of ₹ 2.50 was made and all amount paid except two calls of ₹ 2.50 each in respect of 100 shares held by D. These shares were forfeited and reissued at ₹ 8 per share. Pass necessary journal entries to record the transactions of final call, forfeiture of shares and reissue of forfeited shares. Also, prepare the Balance Sheet of the company.						
29	<p>Sheetal Ltd. issued for Public subscription 50,000 equity shares of ₹ 10 each at a premium of 30% payable as under:</p> <p>₹ 4 on application ₹ 5 on allotment (including premium) ₹ 4 on first & final call</p> <p>Applications were received for 1,00,000 shares. Allotment was made pro - rata to the applicants for 80,000 shares, the remaining applications being refused. Money overpaid on the application was utilised towards sums due on allotment. Gupta, to whom 1,000 shares were allotted, failed to pay the allotment and call money and the shares were subsequently forfeited. Half of the forfeited shares were reissued as fully paid at a discount of 10%. Show the journal entries to record the above transactions.</p>						
30	<p>Rohit Ltd. issued a prospectus inviting applications for 1,00,000 shares of ₹ 10 each. These shares were issued at par on the following terms:</p> <p>On application ₹ 2.50, on allotment ₹ 2.50, on first call ₹ 3 and on final call the balance.</p>						

Applications were received for 1,35,000 shares. Allotments were made on the following basis:

(i) To applicants for 25,000 shares	in full
(ii) To applicants for 60,000 shares	45,000 shares
(iii) To applicants for 50,000 shares	30,000 shares

All excess amount paid on application is to be adjusted against the amount due on allotment.

The shares were fully called and paid - up except the amount of allotment, first and final call not paid by those who applied for 4,000 shares of the group applying for 50,000 shares.

All the shares on which calls were not paid were forfeited by the Board of Directors. 1,800 forfeited shares were re - issued as fully paid on receipt of ₹ 9 per share.

Prepare Cash Book and Journal entries to record the above.

31 A Co. Ltd. offered to the public 20,000 equity shares of ₹ 100 each at a premium of ₹ 10 per share. The payment was to be as follows:

On Application	₹ 30 per share
On Allotment	₹ 30 per share (including premium)
On First Call	₹ 25 per share
On Second & Final Call	₹ 25 per share

Applications were received for 35,000 shares. Applications for 10,000 shares were rejected. Applicants for 15,000 shares were allotted 10,000 shares and the remaining applications were accepted in full. The Directors made both the calls. One shareholder holding 500 shares failed to pay the two calls and as a consequence, his shares were forfeited. 200 of these shares were re - issued as fully paid at ₹ 80 per share. Expenses of issue came to ₹ 10,000.

Prepare Cash Book and Journal on the basis of information given above. Also show the Share Capital in the Balance Sheet of the Company.

32 Ajay Ltd. issued 10,000 shares of ₹ 10 each payable as; ₹ 2 on the application, ₹ 3 on the allotment, ₹ 3 on first call and ₹ 2 on second and final call. Applications were received for 15,000 shares. The shares were allotted on a pro rata basis to the applicants of 12,000 shares. All shareholders paid the allotment money except one shareholder who was allotted 200 shares. These shares were forfeited. The first call was made thereafter. The forfeited shares were reissued @ ₹ 9 per share as ₹ 8 paid - up after first call. The second and final call was not yet made. You are required to prepare Cash Book and pass Journal entries.

33 Pushkar Limited invited applications for 30,000 shares of ₹ 100 each at 20% premium. The amount per share was payable as under:

On application - ₹ 40 (including ₹ 10 premium)

On allotment - ₹ 30 (including ₹ 10 premium)

On first call - ₹ 30

On second and final call - Balance

Applications were received for 40,000 shares and pro - rata allotment was made to the applicants for 35,000 shares, the remaining applications being refused.

Excess application money was adjusted towards sums due on allotment.

Yogesh, who applied for 700 shares, failed to pay the allotment money and his shares were forfeited immediately after allotment.

First call was made thereafter and all the money due on first call was received. The second and final call was not made.

Pass necessary journal entries for the above transactions in the books of Pushkar Limited.

34 Ahuja Ltd. issued 50,000 shares of ₹ 10 each at a premium of 20% payable as ₹ 3 on application, ₹ 4 on allotment (including premium), ₹ 2 on the first call, and the remaining on second call.

Applications were received for 80,000 shares and a pro - rata allotment was made in the ratio of 3 : 2 and the remaining applicants were sent letters of regret. All moneys due were received except allotment and first call from Sanjay who applied for 1,200 shares. All his shares were forfeited. The forfeited shares were reissued for ₹ 9,600. Final call was not made. Pass the necessary journal entries.

35 XY Ltd. invited applications for 5,00,000 Equity shares of ₹ 10 each, payable as ₹ 3 on application, ₹ 4 on allotment and the balance on first and final call. Applications were received for 12,00,000 shares and the shares were allotted on a pro - rata basis. The excess application money was to be adjusted against allotment only. R, a shareholder, who had applied for 6,000 shares, failed to pay the call money and his shares were accordingly forfeited and reissued at ₹ 9 per share as fully paid. Pass necessary journal entries.

36 Pass necessary journal entries for forfeiture and re - issue of shares for the following transactions:

- Sierra Ltd. forfeited 500 shares of ₹ 10 each, issued at a premium of ₹ 2 per share (payable with allotment) for non - payment of allotment money of ₹ 5 per share (including premium). The first and final call of ₹ 3 per share was not made. All the forfeited shares were reissued at ₹ 11 per share, fully paid - up.

	2. Mahira Ltd. forfeited 800 shares of ₹ 10 each on which first call of ₹ 3 per share was not received. The second and final call of ₹ 2 per share was not yet called. Out of these, 400 shares were reissued as ₹ 8 paid - up for ₹ 7 per share.										
37	<p>Pass necessary journal entries for forfeiture and reissue of shares in the following cases:</p> <ol style="list-style-type: none"> 1. Neon Ltd. forfeited 2,000 shares of ₹ 10 each issued at a premium of ₹ 2 per share for non - payment of allotment money of ₹ 5 per share (including premium). The first and final call of ₹ 2 per share was not yet made. Out of these, 1,500 shares were reissued at ₹ 7 per share, ₹ 8 paid up. 2. Mamta Ltd. forfeited 3,000 shares of ₹ 10 each on which the first call of ₹ 3 per share was not received. The second and final call of ₹ 1 per share was not yet called. Out of these, 2,000 shares were reissued at ₹ 9 per share, ₹ 9 paid up. 										
38	<p>XYZ Ltd. invited applications for issuing 50,000 equity shares of ₹ 10 each at a premium of ₹ 8 per share. The amount was payable as follows :</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th style="text-align: center;">₹</th> </tr> </thead> <tbody> <tr> <td>On Application</td> <td>4 per share (including ₹ 2 premium)</td> </tr> <tr> <td>On Allotment</td> <td>6 per share (including ₹ 3 premium)</td> </tr> <tr> <td>On First Call</td> <td>5 per share (including ₹ 1 premium)</td> </tr> <tr> <td>On Second and Final Call</td> <td>Balance Amount</td> </tr> </tbody> </table> <p>The issue was fully subscribed. Ganesh, a shareholder holding 200 shares, did not pay the allotment money and Mayank, a holder of 400 shares, paid his entire share money along with the allotment money. Ganesh's shares were immediately forfeited after allotment. Afterwards, the first call was made. Kartik, a holder of 100 shares, failed to pay the first call money and Gaurav, a holder of 300 shares, paid the second call money also along with the first call. Kartik's shares were forfeited immediately after the first call. Second and final call was made afterwards and was duly received. All the forfeited shares were reissued at ₹ 9 per share fully paid up. Pass necessary journal entries for the above transactions in the books of the company.</p>		₹	On Application	4 per share (including ₹ 2 premium)	On Allotment	6 per share (including ₹ 3 premium)	On First Call	5 per share (including ₹ 1 premium)	On Second and Final Call	Balance Amount
	₹										
On Application	4 per share (including ₹ 2 premium)										
On Allotment	6 per share (including ₹ 3 premium)										
On First Call	5 per share (including ₹ 1 premium)										
On Second and Final Call	Balance Amount										
39	<p>Pass necessary journal entries for the forfeiture and reissue of shares in the following cases:</p> <ol style="list-style-type: none"> 1. CC Ltd. forfeited 10,000 shares of ₹ 10 each, ₹ 8 called up, for non - payment of allotment money of ₹ 3 per share and first call of ₹ 3 per share. Out of these, 2000 shares were reissued for ₹ 7 per share, ₹ 8 paid up. 2. GG Ltd. forfeited 2000 shares of ₹ 10 each fully called up, issued at a premium of 10% on which only application money of ₹ 3 per share was received. Out of these, 500 shares were re - issued at ₹ 11 per share, fully paid up. 										
40	<p>Pass the necessary journal entries for forfeiture and reissue of shares in the following cases:</p> <ol style="list-style-type: none"> 1. Premier Ltd. forfeited 600 shares of ₹ 10 each issued at a premium of ₹ 3 per share (payable with allotment) for non - payment of allotment money of ₹ 7 per share including premium. The first and final call of ₹ 3 per share was not yet made. The forfeited shares were reissued at ₹ 13 per share fully paid up. 2. Risha Ltd. forfeited 1000 shares of ₹ 10 each, ₹ 8 per share called up issued at a premium of ₹ 2 per share to Atul, for non - payment of allotment money of ₹ 6 per share (including premium). Out of these, 800 shares were reissued at ₹ 7 per share, ₹ 8 paid up. 										
41	<p>Sujan Limited issued ₹ 10,00,000 new capital divided into ₹ 100 shares at a premium of ₹ 20 per share, payable as under:</p> <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>On Application</td> <td>₹ 10 per share</td> </tr> <tr> <td>On Allotment</td> <td>₹ 40 per share (including premium of ₹ 10 per share)</td> </tr> <tr> <td>On First and Final Call</td> <td>Balance</td> </tr> </tbody> </table> <p>Over - payments on application were to be applied towards sums due on allotment and first and final call. Where no allotment was made, money was to be refunded in full.</p> <p>The issue was oversubscribed to the extent of 13,000 shares. Applicants for 12,000 shares were allotted only 2,000 shares and applicants for 3,000 shares were sent letters of regret and application money was returned to them. All the money due was duly received.</p> <p>Give Journal Entries to record the above transactions (including cash transactions) in the books of the company.</p>	On Application	₹ 10 per share	On Allotment	₹ 40 per share (including premium of ₹ 10 per share)	On First and Final Call	Balance				
On Application	₹ 10 per share										
On Allotment	₹ 40 per share (including premium of ₹ 10 per share)										
On First and Final Call	Balance										
42	<p>VLX Ltd. invited applications for issuing 1,00,000 equity shares of ₹ 10 each at par. The amount was payable as follows:</p> <p>On Application - ₹ 3 per share; On Allotment - ₹ 4 per share; and On First and Final Call - ₹ 3 per share.</p> <p>The issue was over subscribed by three times. Applications for 20% shares were rejected and the money refunded. Allotment</p>										

Category	No. of Shares Applied	No. of Shares Allotted
I	1,60,000	80,000
II	80,000	20,000

was made to the remaining applicants as follows;

Excess money received with applications was adjusted towards sums due on allotment and first and final call. All calls were made and were duly received except the final call by a shareholder belonging to Category I who has applied for 320 shares. His shares were forfeited. The forfeited shares were reissued at ₹ 15 per share fully paid - up.

Pass necessary Journal entries for the above transactions in the book of VLX Ltd. Open calls - in - Arrears and Calls - in - Advance Account whenever required.

43 Printkit Limited invited applications for issue of 80,000 equity shares of ₹ 10 each. The amount was payable as follows:
 On Application - ₹ 3 per share
 On Allotment - ₹ 2 per share
 On First and Final call - Balance
 Applications for 1,50,000 shares were received. Applications for 10,000 shares were rejected and pro - rata allotment was made to the remaining applicants on the following basis:
 Category A - Applicants for 80,000 shares were allotted 40,000 shares.
 Category B - Applicants for 60,000 shares were allotted 40,000 shares.
 Excess money received on application was adjusted towards amount due on allotment and first and final call. All the amounts due on allotment and first and final call were duly received.
 Pass necessary journal entries in the books of Printkit Limited.

44 Manav Papers Ltd. invited applications for issuing 1,00,000 shares of ₹ 10 each at a premium of ₹ 4 per share payable as follows:
 On Application ₹ 4 (including premium ₹ 2)
 On Allotment ₹ 4 (including premium ₹ 2)
 On First & Final Call ₹ 6
 Applications were received for 1,30,000 shares and pro - rata allotment was made to all applicants as follows:
 1. Applicants for 80,000 shares were allotted 60,000 shares, and
 2. Applicants for 50,000 shares were allotted 40,000 shares.
 X, who belonged to the first category and was allotted 900 shares failed to pay the allotment and call money.
 Y, who belonged to the second category and who applied for 1,000 shares also failed to pay the allotment and call money. Their shares were forfeited and 1,400 of the forfeited shares were re - issued @ ₹ 9 per share as fully paid. Re - issued shares included the whole of Y's shares.
 Prepare Cash Book, journal entries and an opening Balance Sheet.

45 Eastern Company Limited, with an authorised capital of ₹ 10,00,000 is divided into equity shares of ₹ 10 each, issued 50,000 equity shares at a premium of ₹ 3 per share payable as follows:

On Application	₹ 3 per share
On Allotment (including premium)	₹ 5 per share
On first call (due three months after allotment) and the balance as when required.	₹ 3 per share

Applications were received for 60,000 shares and the directors allotted the shares as follows:
 1. Applicants for 40,000 shares received in full.
 2. Applicants for 15,000 shares received an allotment of 8,000 shares.
 3. Applicants for 5,000 shares received 2,000 shares on allotment, excess money being returned.
 All amounts due on allotment were received.
 The first call was made and the money was received except on 100 shares.
 Give journal and cash book entries to record these transactions of the company. Also prepare the Balance Sheet of the company.

46 Manjeet Ltd. issued 4,00,000 equity shares of ₹ 10 each at par. The amount per share was payable as follows:
 ₹ 3 on application; ₹ 2 on allotment; ₹ 2 on first call and ₹ 3 on final call. The issue was fully subscribed and the shares were allotted fully to all the applicants. All calls were made Mahinder, a shareholder holding 6,000 shares paid the final call money along with the first call. Shivam holding 700 shares did not pay the first call on the due date. Shivam paid the first call along with the final call. The accountant of the company had correctly passed the entries till receipt of allotment money. After that the following entries were left incomplete by him. Complete these entries.

Date	Particulars	L.F.	Dr. (₹)	Cr. (₹)
	Equity Share first call A/c	Dr.	8,00,000	
	To _____ (First call due on 4,00,000 shares @ ₹ 2 per share)			8,00,000
	Bank A/c	Dr.	—	
	_____	Dr.	—	
	To Equity Share first call A/c			—
	To _____ (_____)			—
	Equity Share second and final call A/c	Dr.	—	
	To Equity Share Capital A/c (Final call due on 4,00,000 shares @ ₹ 3 per share)			—
	Bank A/c	Dr.	—	
	_____	Dr.	—	
	To Equity Share second and final call A/c			—
	To _____ (_____)			—
47	AD Deli Ltd. invited applications for 20,000 Equity Shares of ₹ 10 each at the issue price of ₹ 10. The amount payable along with application is ₹ 10. The issue was fully subscribed. Pass Journal entries for the above transactions and also prepare Balance Sheet of the Company.			
48	Eastern Company Limited issued 40,000 shares of ₹ 10 each to the public for the subscription out of its share capital, payable as ₹ 4 on application, ₹ 3 on the allotment, and the balance on 1st and final call. Applications were received for 40,000 shares. The company made the allotment to the applicants in full. All the amounts due on the allotment and first and final call were duly received. Give the journal entries in the books of the company.			
49	Authorised capital of Seema Ltd. is ₹ 45,00,000 divided into 30,000 shares of ₹ 150 each. Out of these company issued 15,000 shares of ₹ 150 each at a premium of ₹ 10 per share. The amount was payable as follows: ₹ 50 per share on application, ₹ 40 per share on allotment (including premium), ₹ 30 per share on first call and balance on final call. Public applied for 14,000 shares. All the money was duly received. Prepare an extract of Balance Sheet of Seema Ltd. as per Schedule III, Part I of the Companies Act, 2013 disclosing the Share Capital.			
50	Esha Ltd. was formed with a capital of ₹ 10,00,000 divided into shares of ₹ 100 each. It offered 90% shares to public for subscription. The amount per share was payable as 40% on application, 20% on allotment and the balance on first and final call. The applicants paid ₹ 3,60,000 on application and ₹ 1,69,000 on allotment. The call has not yet been made. Calculate: (a) Authorised Capital, (b) Issued Capital, (c) Subscribed Capital, (d) Called - up Capital, (e) Paid - up Capital, and (f) Calls - in - Arrears.			

विषय – हिंदी

1. 'आत्मपरिचय' कविता का भावार्थ लिखिए और याद कीजिए।
2. 'आत्मपरिचय' कविता से संबंधित सभी प्रश्नों को याद कीजिए और लिखिए।
3. 'पतंग' कविता का भावार्थ लिखिए और याद कीजिए।
4. 'पतंग' कविता से संबंधित सभी प्रश्नों को याद कीजिए और लिखिए।
5. 'भक्तिन' पाठ का सारांश लिखिए।
6. 'भक्तिन' पाठ से संबंधित सभी प्रश्नों को याद कीजिए और लिखिए।
7. डायरी क्या है? डायरी लेखन की कला को स्पष्ट कीजिए।
8. 'ग्लोबल वार्मिंग - मनुष्य के लिए खतरा' शीर्षक पर लगभग 150 शब्दों एक अनुच्छेद लिखिए।
9. एक लघु कथा लिखिए जिसमें 'बुद्धि सबसे बड़ा धन है' की शिक्षा मिलती हो।
10. 'दीवाल घड़ी' विषय पर एक फीचर लिखिए।
11. अपने गांव के शिक्षा से वंचित बच्चों को शिक्षित करने के लिए आप क्या कर सकते हैं? अपने विचारों को लगभग 150 शब्दों में लिखिए।
12. अपने विद्यालय के वार्षिकोत्सव पर एक रिपोर्ट तैयार कीजिए।
13. जनसंचार और मध्यम विषय पर एक प्रोजेक्ट फाइल तैयार कीजिए।

History

Practice sheet -1

- 1) Describe briefly what was found in burials at the Harappan sites.
- 2) Explain the methods of irrigation used by the Harappans at different sites.
- 3) The domestic architecture of Mohenjodaro was unique. Explain the statement with examples.
- 4) Mention any three mature Harappan sites.
- 5) The domestic architecture of Mohenjodaro was unique. Explain the statement with examples.
- 6) Mention any three mature Harappan sites.
- 7) The most unique feature of the Harappan civilization was the development of domestic architecture. Substantiate the statement.
- 8) Describe the methods of irrigation used by Harappans for agriculture.
- 9) "The Harappans were known for their advanced urban planning." Justify the statement with suitable arguments
- 10) Analyse the scholars' views on Harappan script.
- 11) Over the decades, new issues have assumed importance in the archaeology of Harappa. Give two evidences to justify the statement.
- 12) Why do archaeologists and historians find Harappan script enigmatic? Explain reasons.
- 13) Would you agree that the drainage system in Harappan cities indicates town planning? Give reasons for your answer.
- 14) Describe briefly how seals of Harappan period help in reconstructing their religious beliefs.
- 15) Explain how did archaeologists identify the centres of craft production of the Harappan age.
- 16) There are indications of complex decisions being taken and implemented in the Harappan society. In light of this statement, explain whether there may have been rulers to rule over the Harappan society.
- 17) Who was John Marshall? How did he mark a change in the Indian archaeology?
- 18) Archaeologists have used evidence from material remains to piece together parts of Harappan history. Justify the statement with reference to the principles of classification.
- 19) Describe the distinctive features of domestic architecture of Mohenjodaro.
- 20) Prove with the help of examples that the Harappans had established their contacts with Western Asia for purchase/exchange of artifacts.

Practice sheet -2

- 1) Who was R.E.M Wheeler? Mention any one of his contributions in the field of archaeology?
- 2) Many reconstructions of Harappan religion are made on assumptions and archaeological interpretation. Substantiate the statement.
- 3) Describe the economic life of the Harappan people.
- 4) Explain why the seals and sealings were used by the Harappans.
- 5) Why is the Harappan drainage system considered a planned and complete drainage system? Explain.
- 6) Harappan script is considered as an enigmatic script. Justify the statement with suitable arguments.
- 7) Explain how burials help in understanding the social and economic differences amongst the people in Harappan civilization.
- 8) One of the most distinctive features of Harappan cities was the carefully planned drainage system. Substantiate the statement.
- 9) Mohenjodaro was a planned Urban Centre. Support the statement with suitable arguments.
- 10) What extent were agricultural practices transformed in the period under consideration?
- 11) Who was a Gahapati?
- 12) Discuss the evidence of craft production in Early Historic cities. In what ways is this different from the evidence from Harappan cities?
- 13) Coinage plays a valuable role in determining a certain period of Indian history. Justify the statement giving two points.
- 14) Which was the strongest Mahajanpadas ? Explain the reasons.
- 15) Explain the agricultural practices of mauryan Empire.

Project work:-

A FEW SUGGESTIVE TOPICS FOR CLASS XII PROJECTS

1. The Indus Valley Civilization-Archaeological Excavations and New Perspectives

2. The History and Legacy of Mauryan Empire
3. "Mahabharat"- The Great Epic of India
4. The History and Culture of the Vedic period
5. Buddha Charita
6. A Comprehensive History of Jainism
7. Bhakti Movement- Multiple Interpretations and Commentaries.
8. The Mystical Dimensions of Sufism
9. Global Legacy of Gandhian Ideas
10. The Architectural Culture of the Vijayanagar Empire
11. Life of Women in the Mughal Rural Society
12. Comparative Analysis of the Land Revenue Systems Introduced by the Britishers in India
13. The Revolt of 1857- Causes; Planning & Coordination; Leadership, Vision of Unity
14. The Philosophy of Guru Nanak Dev
15. The Vision of Kabir
16. An Insight into the Indian Constitution
17. Comparative Study of Stupas and Pillar Edicts
18. Comparative Study of Mughal and Vijayanagar Architecture

Steps involved in the conduct of the project: Students may work upon the following lines as suggested:-

1. Choose a Title/Topic
2. Need of the Study, Objective of the Study
3. Hypothesis
4. Content -Timeline, Maps, Mind maps, Pictures, etc. (Organization of Material/Data Present Material/Data)
5. Analysing the Material/Data for Conclusion
6. Draw the Relevant Conclusion
7. Bibliography

IT (802)

RDBMS Query Based Questions

A. Table Name: STUDENT

SID	NAME	CLASS	MARKS	CITY
101	Aman	12	85	Delhi
102	Ravi	12	72	Mumbai
103	Sneha	11	91	Delhi
104	Karan	12	67	Kolkata
105	Pooja	11	88	Chennai

- Q1. Write an SQL query to display all records from the STUDENT table.
- Q2. Write a query to display only NAME and MARKS columns.
- Q3. Write a query to display students who belong to class 12.
- Q4. Write a query to display students scoring more than 80 marks.
- Q5. Write a query to display students from Delhi.
- Q6. Write a query to display student names in ascending order.
- Q7. Write a query to display student names in descending order.
- Q8. Write a query to count total number of students.
- Q9. Write a query to find the highest marks.
- Q10. Write a query to find the lowest marks.
- Q11. Write a query to find average marks of students.
- Q12. Write a query to display distinct city names.
- Q13. Write a query to display students whose marks are between 70 and 90.
- Q14. Write a query to display students whose names start with letter 'A'.
- Q15. Write a query to display students whose city is either Delhi or Mumbai.

- Q16. Write a query to add a new student record.
 Q17. Write a query to update marks of student with SID 104.
 Q18. Write a query to delete the record of SID 105.
 Q19. Write a query to create STUDENT table.
 Q20. Write a query to display students with marks greater than average marks.

B. Consider the below table name “Employees” and answer the following question.

Table : Employees						
E_ID	E_Name	E_Job_Title	E_sal	E_Bonus	E_Age	E_Mgr_ID
1201	Divya Singh	President	50000	NULL	29	NULL
1205	Amyra Khan	Manager	30000	2500	26	1201
1211	Rahul Nigam	Analyst	20000	1500	23	1201
1213	Manish Negi	Salesman	15000	NULL	22	1201
1216	Megha Patil	Analyst	22000	1300	25	1205
1217	Mohit sharma	Salesman	16000	NULL	22	1205

▪ **Write SQL queries from (i) to (v).**

- Create the above given table
- Update the salary of “Amyra Khan” to 40000.
- Write a query to display details of employees who are not getting any bonus.
- Write a query to display the names of employees whose name contains “a” as the last alphabet.

Write a query to delete the details of those employees those who are working under manager_id 1205.

Programming based question

- Write a program in java to print armstrong number.
- Write a program to print following pattern:

```
*
* *
* * *
* * * *
```

CHAPTER- BIOTECHNOLOGY PRINCIPLE AND PROCESSES

(2021-22) 2-Marks Questions

- What are the roles of:
 - restriction enzymes
 - DNA ligase
 in recombinant DNA technology?
- Explain the function of:
 - origin of replication (ori)
 - selectable marker
 in a cloning vector.
- Why are “sticky ends” formed in recombinant DNA technology considered useful?
- Differentiate between:
 - exonuclease
 - endonuclease
- Why is plasmid used as a cloning vector?
- Explain the process of making bacterial cells “competent”.
- Why is *Agrobacterium tumefaciens* called a natural genetic engineer?
- What is PCR? Name the enzyme used in it and state its role.
- Why are antibiotics used as selectable markers in cloning vectors?
- What is downstream processing?

3-Marks Questions

- Describe the steps involved in recombinant DNA technology.
- Explain the process of PCR with the help of:
 - denaturation
 - annealing

- extension
3. Draw and label a diagram of a bioreactor. Mention any two advantages.
 4. Explain the role of:
 - cloning vectors
 - competent host
 - restriction enzymes in gene cloning.
 5. How is recombinant insulin produced using biotechnology?
 6. Explain gel electrophoresis and its significance in DNA separation.
 7. Describe the process of insertion of recombinant DNA into host cells.
 8. Explain the importance of:
 - EcoRI
 - palindromic nucleotide sequences

Case-Based / Long Questions

1. A scientist isolated a gene of interest and inserted it into a bacterial plasmid. Based on this:
 - explain formation of recombinant DNA
 - explain transformation
 - explain selection of recombinants
2. A biotechnology company wanted mass production of a therapeutic protein:
 - explain the role of bioreactors
 - explain downstream processing
 - mention precautions during production
3. Read the passage based on PCR/restriction enzymes and answer:
 - why Taq polymerase is used
 - importance of primers
 - significance of amplification

(2022-23) 1-Mark Questions

1. Name the enzymes used in genetic engineering to cut DNA at specific sites.
2. Write the conventional nomenclature of the restriction enzyme **EcoRI**.
3. Name the technique used to separate DNA fragments after they are cut by restriction enzymes.
4. Name the bacterium that yields the thermostable DNA polymerase used in PCR.

2-Mark Questions

1. Define "downstream processing" and name the two main steps involved.
2. What is meant by making a host cell "competent"? Mention one chemical method used for this.
3. Why are the recognition sequences of restriction enzymes called "palindromes"? Give one example.

3-Mark Questions

1. Explain the role of ampicillin and tetracycline resistance genes in the vector **pBR322**. How do they help in differentiating recombinants from non-recombinants?

Briefly describe the three main steps of the **Polymerase Chain Reaction (PCR)**.

5-Mark Questions

1. List and explain the three essential features of a cloning vector
2. Describe the process of isolating a desired DNA fragment and inserting it into a host cell.
3. Differentiate between a simple stirred-tank bioreactor and a sparged stirred-tank bioreactor. Why is a bioreactor necessary for large-scale production?

(2023-24) 1-Mark Questions

1. In gel electrophoresis, DNA fragments stained with ethidium bromide appear as which color when viewed under UV radiation?
2. Which of the following groups of enzymes produces "sticky ends"?
(a) AluI, HindII (b) EcoRI, BamHI, HindIII (c) ScaI, EcoRV.
3. **Assertion:** It is very difficult to produce hybrids in inter-generic crosses.
Reason: The abnormal development of endosperm leads to death of the hybrid embryo.
4. **Assertion:** Animal cells *in vitro* divide until they fill the surface of the culture vessel and then stop growing.
Reason: Animal cells can be grown up to only limited generations.

2 & 3 -Mark Questions

1. Write the DNA sequence for the restriction site of the enzyme **EcoRI**. Name the type of ends generated by this enzyme.
2. You are given ampicillin and tetracycline antibiotics. Using these, explain the technique used to differentiate between **recombinant** and **non-recombinant** cells.
3. Explain any two vectorless methods (e.g., Micro-injection, Biolistics/Gene gun) that allow foreign DNA to enter host cells.
4. Name the two main steps collectively referred to as downstream processing. Why is this process significant for a product before it reaches the market?
5. Why is a small size desirable for a cloning vehicle (vector)?

5-Mark Questions

1. Describe the three main steps of the **Polymerase Chain Reaction (PCR)**. Mention the importance of the enzyme *Taq* polymerase in this process.
 2. Compare a **Stirred-tank bioreactor** with a **Shake flask**. What advantages does the stirred-tank bioreactor provide for large-scale production?
-

(2024-25) 1-Mark Questions

1. "DNA fragments can be isolated by Gel electrophoresis on the basis of their size." (Assertion-Reasoning).
2. "Most of the commonly used cloning vectors contain multiple cloning sites (MCS).
Reason: MCS provide flexibility in the choice and use of restriction enzymes."

2-Mark Questions

1. Explain with an example the difference between **Blunt ends** and **Sticky ends** produced by restriction enzymes. Which one is better for recombinant DNA technology and why?
2. "How are recombinant cells selected if the vector used is **pUC19**?"
3. Give three advantages that *E. coli* offers as a host cell in biotechnology.
4. Explain why DNA fragments move towards the anode and how they are visualized on an agarose gel.

5-Mark Questions

1. You may be asked to identify specific parts of the plasmid and explain the role of selectable markers in identifying transformants.
 2. Define the steps involved in the isolation of a desired microbial product (separation, purification, and preservation).
 3. Explain the difference between a **simple stirred-tank bioreactor** and a **sparged stirred-tank bioreactor**. Why are they provided with baffles and oxygen delivery systems?
 4. Describe two methods (e.g., Micro-injection, Biolistics/Gene gun) that allow foreign DNA to enter host cells without a vector.
-

(2025-26) 2-Mark Questions

1. What is the significance of 'selectable markers' in a cloning vector?
2. Name the first restriction endonuclease to be discovered and isolated.
3. Why is *Thermus aquaticus* used in PCR?
4. Define 'palindromic nucleotide sequences'.

3-Mark Questions

1. Explain the role of Restriction Enzymes, DNA Ligase, and Alkaline Phosphatase in creating recombinant DNA.
2. Draw a simplified diagram of the **pBR322** vector. Identify the *ori*, *amp^R*, and *tet^R* sites.
3. Describe the "Heat Shock" method used to make host cells competent.
4. Explain the principle of **Gel Electrophoresis**. Why does DNA move towards the anode?

5-Mark Questions

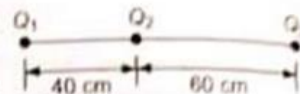
1. Detail the three steps of Polymerase Chain Reaction (PCR): **Denaturation, Annealing, and Extension**. Mention the temperature requirements for each.
2. Describe the stages involved in processing a biosynthetic product before it is ready for marketing.
3. Compare and contrast a **Simple Stirred-tank bioreactor** and a **Sparged stirred-tank bioreactor**. Why is oxygen availability crucial here?

NUMERICAL PROBLEMS FOR PRACTICE (NPP)**Electric Charges and Coulomb's Law**

1. Calculate the charge carried by 12.5×10^{18} electrons [CBSE]
2. A polythene piece rubbed with wool is found to have a negative charge of 3.2×10^{-7} C.
 - (a) Estimate the number of electrons transferred and indicate the substance from which it has transferred to the other.
 - (b) Is there a transfer of mass from wool to polythene? [CBSE]
3. The magnitude of the charges on three identical balls, A, B and C is in the ratio of 1 : 3 : 7. The charges on A and B are positive and the charge on 'C' is -1.4×10^{-7} C. Calculate
 - (i) charge on A and B.
 - (ii) charge on each when they were brought in contact and then separated.
4. Two identical metal balls A and B each carrying equal positive charges repel each other with a force of 1.6 N. A third identical but uncharged metal ball is successively made to touch the spheres A and B and then taken far away. What is the new force of repulsion between A and B?
5. Two identical small spheres having unequal and opposite charges are placed at a distance of 0.90 m apart. They are made to touch each other and again placed at the same distance apart. If now they repel each other with a force of 0.025 N, find charges on them. [UPB]
6. Two identical conducting balls having unequal charges attract each other with a force of 0.108 N when separated by 0.5 m. The spheres are made to touch each other and then taken back at the same separation. It is found that they now repel each other with a force of 0.036 N. Find the initial charges on the spheres.
7. Two similarly and equally charged identical metal spheres A and B repel each other with a force of 2×10^{-5} N. A Third identical uncharged sphere C is touched with A and then placed at the mid point between A and B. Calculate the net electric force on C. [CBSE-2003]
8. The sum of two point charges is $-15 \mu\text{C}$. They attract each other with a force of 9.0×10^{-2} N when kept 5 m apart. Find their charges.
9. Calculate the distance between two protons such that the electrical repulsive force between them is equal to the weight of the either. [CBSE]

Mass of a proton = 1.6×10^{-27} Kg
Acc. due to gravity (g) = 10 m/s^2
10. Calculate the coulomb force between two α particles separated by a distance of 3.2×10^{-15} m. [CBSE]
11. Two point charges q_1 and q_2 are 3 m apart and their combined charge is $20 \mu\text{C}$. If one repels the other with a force of 0.075 N, what are the two charges? [PSSCE]
12. Two particles each of mass 4 gm and charge 2×10^{-7} C remain in static equilibrium on a horizontal table at a distance 20 cm. The coefficient of friction between each particle and the table is the same. Find the value of coefficient of static friction.
13. Two identical small balls each having charge 3×10^{-6} C and connected by a light insulating string of length 60 cm are kept on a horizontal smooth table. Find the tension in the string.
14. Two identical point charges q each, are kept 2 m apart in air. A third charge Q of unknown magnitude and sign is placed on the line joining the charges such that the system remains in equilibrium. Find the position and nature of Q . [CBSE 2019]
15. Two point charges q and $2q$ are kept d distance apart in air. A charge Q is placed along the same line such that the net forces on q and $2q$ are zero. Find the position of Q . [CBSE]

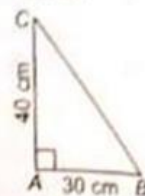
16. Three charges Q_1 , Q_2 and Q_3 of $+2 \mu\text{C}$ each are kept along a straight line as shown in the figure.



(i) which of them experiences the maximum force and what is its magnitude and direction?

(ii) what is the magnitude and direction of the net force on the charge Q_2 ?

17. Three charges of $+3 \mu\text{C}$, $+2 \mu\text{C}$ and $-5 \mu\text{C}$ are kept at the vertices A, B and C of right triangle as shown in the figure. Find the magnitude and direction of the net force on the charge at B.

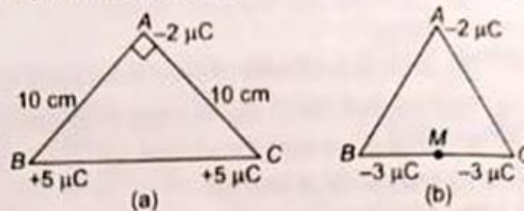


18. (a) Three point charges are located at the corners of an isosceles triangle ABC right angled at A as shown in Fig. (a).

(i) Find the magnitude and direction of the net force on the charge at C.

(ii) What should be the sign and magnitude of the charge to be kept at the mid-point of BC so that the charge at A remains in equilibrium?

- (b) Three point charges of $+2 \mu\text{C}$, $-3 \mu\text{C}$ and $-3 \mu\text{C}$ are kept at the vertices A, B and C respectively of an equilateral triangle of side 20 cm. What should be the sign and magnitude of the charge to be placed at the mid point (M) of side BC so that the charge at A remains in equilibrium.



[CBSE-2005]

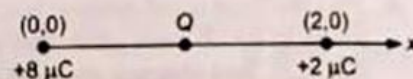
19. Four equal point charges $+2 \mu\text{C}$ each are kept at the corners of a square with side 40 cm. Find the magnitude and direction of the net force on

(i) any one of the charges at the corner.

(ii) a charge of $+1 \mu\text{C}$ kept at the centre of the square.

20. Three point charges are located on $+x$ -axis as shown in the figure.

What should be the sign, magnitude and location of the third charge Q so that it experiences no force.



Electric Field and Electric Dipole

21. The intensity of electric field at a distance of 1 m from a point charge is 450 Vm^{-1} . Find the magnitude of the charge. [UPB]

22. Find the electric intensity at a point where a charge of $5 \times 10^{-4} \text{ C}$ experiences a force of 2.25 N. [UPB]

23. At what distance from a point charge of $4 \mu\text{C}$ in air will the electric field intensity be 90 NC^{-1} ?

24. An α particle is placed in an electric field of $1.5 \times 10^4 \text{ NC}^{-1}$. Calculate the force on the particle. (Given - charge on an α particle = $3.2 \times 10^{-19} \text{ C}$) [UPB]

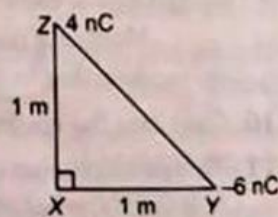
25. Two point charges $q_1 = 0.2 \text{ C}$ and $q_2 = 0.4 \text{ C}$ are 0.1 m apart. Find the electric field at

(i) mid-point between charges

(ii) a point on the line joining q_1 and q_2 such that it is 0.05 m away from q_2 and 0.15 m away from q_1 .

[CBSE]

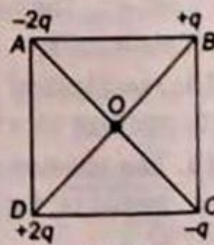
26. Charges of 4 nC and -6 nC are placed at the two ends of the hypotenuse of the right angled isosceles triangle as shown. Find the magnitude and direction of the resultant electric field at the point X. [CBSE-2013]



27. Four equal charges $+q$ are kept at the four corners A, B, C and D of a square of each side l .

(a) Find electric field intensity at (i) Centre of the square and (ii) Corner (A) of the square.

(b) How will your answer to part (i) and (ii) change when the charge at A is made $-q$.



[ISCE]

28. Four point charges are placed at the corners of a square of side 2 cm (Fig. A). Find the magnitude and direction of electric field at the centre of the square, if $q = 0.02 \mu\text{C}$.

29. The bob of a simple pendulum of mass 100 milligram carrying a charge of $4 \times 10^{-8} \text{ C}$ is at rest in a horizontal uniform electric field of $2.5 \times 10^4 \text{ Vm}^{-1}$. Assuming $g = 10 \text{ ms}^{-2}$.

Find (i) tension in the string of the pendulum and (ii) angle it makes with the vertical.

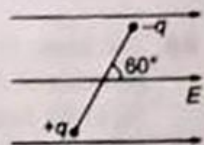
Fig. A

30. A system has two electric charges $q_A = 2.5 \times 10^{-7} \text{ C}$ and $q_B = -2.5 \times 10^{-7} \text{ C}$ located at points A (0, 0, -15 cm) and B (0, 0, +15 cm) respectively. Calculate the electric dipole moment of the system. What is its direction?

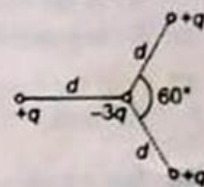
[CBSE (Comptt.)-2005]

31. Two charges $\pm 10 \mu\text{C}$ are placed 5.0 mm apart. Determine the electric field at
 (i) a point on the axis of the dipole 15 cm away from its centre O on the side of the positive charge and
 (ii) a point 15 cm away from O on equatorial axis of the dipole.
32. An electric dipole consists of $3 \times 10^{-8} \text{ C}$ and $-3 \times 10^{-8} \text{ C}$ charges lying 2 cm apart. Find electric field at a point lying on its (i) axis 5 cm from its centre, (ii) equatorial line 3 cm from its centre.

33. An electric dipole consisting of charges of $2 \times 10^{-10} \text{ C}$ and $-2 \times 10^{-10} \text{ C}$ separated by a distance of 5 mm is lying in a uniform electric field of 10 Vm^{-1} as shown in figure. Find the
 (i) magnitude and direction of the force acting on each charge
 (ii) torque exerted by the field
 (iii) potential energy of the dipole



34. Figure shows a combination of three identical electric dipoles. Find the
 (i) dipole moment of the combination
 (ii) magnitude of each charge of the equivalent electric dipole having its charges at the same separation.



35. An electric dipole consists of $\pm 1 \mu\text{C}$ charges kept 10 cm apart. It lies in a uniform electric field of $5 \times 10^4 \text{ NC}^{-1}$. If it experiences a torque of $2.5 \times 10^{-3} \text{ Nm}$. Find the
 (i) angle its axis makes with the field (\vec{E}).
 (ii) potential energy of the dipole.
 (iii) work done in turning it from its present position to the position of unstable equilibrium.
 (iv) position of the dipole in which the magnitude of the torque acting on the dipole becomes equal to its potential energy.
 (v) maximum and minimum values of the potential energy of the dipole.

36. A molecule of a substance has permanent dipole moment equal to 10^{-29} Cm . A mole of this substance is polarized (at low temperature) by applying a strong electrostatic field of magnitude of 10^6 Vm^{-1} . The direction of the field is suddenly changed by an angle of 60° . Estimate the heat released by the substance in aligning its dipoles along the new direction of the field. For simplicity, assume 100% polarization of the sample. Take avagadro number $N = 6 \times 10^{23}$.

37. A sample of HCl gas is placed in an electric field $2.4 \times 10^4 \text{ NC}^{-1}$. The dipole moment of each molecule is $3.5 \times 10^{-30} \text{ Cm}$. Calculate
 (i) maximum value of torque that can act on a molecule
 (ii) the force that acts on each charge.

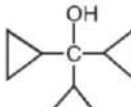
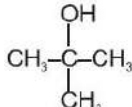
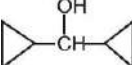
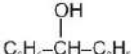

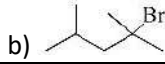


38. A test charge of $2 \times 10^{-9} \text{ C}$, lying on the axial line of short electric dipole 20 cm from its centre, experiences a force of $8 \times 10^{-5} \text{ N}$. Calculate
 (i) dipole moment of the electric dipole.
 (ii) electric field on the axial line 5 cm from its centre
 (iii) electric field on the equatorial line 10 cm from its centre.

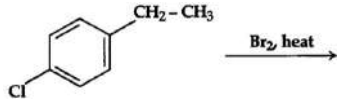
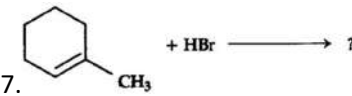
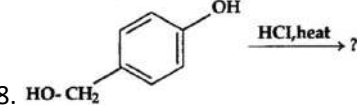
Electric Flux and Gauss's Law

39. A rectangular surface of area 250 cm^2 is kept in a uniform electric field of 400 NC^{-1} . If the flux of electric field through the surface is $5 \text{ Nm}^2 \text{ C}^{-1}$, find the angle which the surface makes with the field.
40. If the electric field is given by $\vec{E} = 6\hat{i} + 3\hat{j} + 4\hat{k}$, calculate the electric flux through a surface of area 20 sq. units lying in YZ plane. [HSSCE]
41. Imagine a charge + 'Q' kept at the centre of a hemispherical surface. Use Gauss's theorem and find flux through the hemispherical surface. Will the flux through the surface change if its radius is doubled?
42. A point charge causes an electric flux of $-4\pi \times 10^3 \text{ Nm}^2/\text{C}$ to pass through a spherical Gaussian surface of radius 10.0 cm centred on the charge.
 (i) Calculate the value of the point charge.
 (ii) If the radius of the Gaussian surface were doubled, how much flux would pass through the surface? Justify your answer. [CBSE-2017]

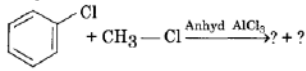
CHEMISTRY

Section A

1	Calculate the molarity of liquid HCl solution whose density is 1.17 g/cm^3 . a) 18.25 b) 36.5 c) 32.05 d) 42.10
2	For an electrolyte undergoing association in a solvent, the van't Hoff factor: a) is always greater than one b) is always less than one c) has zero value d) has negative value
3	The value of Henry's constant K_H is _____. a) greater for gases with higher solubility. b) not related to the solubility of gases. c) greater for gases with lower solubility. d) constant for all gases.
4	The vapour pressure of a given liquid will decrease if : a) the temperature is decreased b) the volume of liquid in the container is decreased c) the volume of the vapour phase is increased d) surface area of liquid is decreased
5	Molarity of H_2SO_4 is 0.8 and its density is 1.06 g/cm^3 . What will be its concentration in terms of molality and mole fraction? a) $0.815 \text{ mol kg}^{-1}$ & 0.014 respectively b) $0.815 \text{ mol kg}^{-1}$ & 0.028 respectively c) $0.785 \text{ mol kg}^{-1}$ & 0.028 respectively d) $0.785 \text{ mol kg}^{-1}$ & 0.014 respectively
6	Decreasing order of reactivity of hydrogen halide acids in the conversion of $\text{ROH} \rightarrow \text{RX}$ is: a) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$ b) $\text{HF} > \text{HBr} > \text{HI} > \text{HCl}$ c) $\text{HCl} > \text{HBr} > \text{HI} > \text{HF}$ d) $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$
7	Which one of the following will be most reactive for $\text{S}_\text{N}1$ reaction? a)  b)  c)  d) 
8	Maximum number of molecules of CH_3I that can react with a molecule of CH_3NH_2 is: a) 4 b) 3 c) 1 d) 2
9	Which of the following has the highest melting point? a) All have the same melting point b) o - Dichlorobenzene c) m - Dichlorobenzene d) p - Dichlorobenzene
10	Which of the following alkyl halides would be most likely to give a rearranged product under $\text{S}_\text{N}1$ conditions? a)  b)  c)  d) 
11	Assertion (A): One molal aqueous solution of urea contains 60g of urea in 1 kg (100 g) water. Reason (R): Solution containing one mole of solute in 1000 g solvent is called as one molal solution. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
12	Assertion (A): When NaCl is added in water, elevation in boiling point is observed. Reason (R): Elevation in boiling point is a colligative property. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
13	Assertion (A): ΔH_{mix} and ΔV_{mix} are zero for the ideal solution. Reason (R): The interactions between the particles of the components of a solution are almost identical as between particles in the liquids. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
14	Assertion (A): Solutions having the same osmotic pressure are called isotonic solutions. Reason (R): Ca^{2+} and K^{+} ions are responsible for maintaining proper osmotic pressure balance in the cells of organisms. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.

15	<p>Assertion (A): If a liquid solute more volatile than the solvent is added to the solvent, the vapour pressure of the solution may increase i.e., $p_s > p^o$.</p> <p>Reason (R): In the presence of a more volatile liquid solute, only the solute will form the vapours and solvent will not.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>
16	<p>Assertion (A): Presence of $-NO_2$ group at meta position increases the reactivity of haloarenes towards nucleophilic substitution reactions.</p> <p>Reason(R): $-NO_2$ group decreases the electron density over the benzene ring and thus facilitates the attack of nucleophile on haloarenes.</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>
Section B	
17	An aqueous solution containing 20% by weight of liquid A (Mol.wt = 140) has vapour pressure of 160 mm at $57^\circ C$. Find the vapour pressure of pure A, if that of water is 150 mm at this temperature.
18	Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 185,000 in 450 mL of water at $37^\circ C$.
19	<p>4. What is the relationship between Molarity and Normality?</p> <p>5. One litre of water at N.T.P. dissolves 0.08 g of nitrogen. Calculate the amount of nitrogen that can be dissolved in four litres of water at $0^\circ C$ and at a pressure of 1520 mm.</p>
20	An electrolyte AB is 50% ionized in aqueous solution. Calculate the freezing point of 1 molal aqueous solution.
21	A solution is prepared by dissolving 11 g glucose in 200cm^3 water at $30^\circ C$. What is the mass Percentage of glucose in solution? The density of water $30^\circ C$ is $0.996\text{g}/\text{cm}^3$
22	0.3 g of acetic acid ($M = 60\text{ g mol}^{-1}$) dissolved in 30 g of benzene shows a depression in freezing point equal to $0.45^\circ C$. Calculate the percentage association of acid if it forms a dimer in the solution. (Given: K_f for benzene = $5.12\text{ K kg mol}^{-1}$)
23	At 300 K, 30 g of glucose present in a litre of its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of a glucose solution is 1.52 bar at the same temperature, what would be its concentration?
24	A 6.90 M solution of KOH in water contains 30% by mass of KOH. Calculate the density of KOH solution. [Given : Molar mass of $KOH = 56\text{ g mol}^{-1}$]
25	The vapour pressure of a solvent at 283 K is 100 mm Hg. Calculate the vapour pressure of a dilute solution containing 1 mole of a strong electrolyte AB in 50 moles of the solvent at 283 K (assuming complete dissociation of solute AB).
26	If benzoic acid ($M = 122\text{ g mol}^{-1}$) is associated into a dimer when dissolved in benzene and the osmotic pressure of a solution of 6.1 g of benzoic acid in 100 mL benzene is 6.5 atm at $27^\circ C$, then what is the percentage association of benzoic acid? (Given : $R = 0.0821\text{ L atm K}^{-1}\text{ mol}^{-1}$)
27	Define osmosis.
28	A solution containing 60 g of a non - volatile solute in 250 g of water freezes at 270.67 K. Calculate the molar mass of the solute. (K_f of water = $1.86\text{ K kg mol}^{-1}$).
29	Liquids 'X' and 'Y' form an ideal solution. The vapour pressure of pure 'X' and pure 'Y' are 120 mm Hg and 160 mm Hg respectively. Calculate the vapour pressure of the solution containing equal moles of 'X' and 'Y'.
30	What type of deviation from Raoult's law is observed by mixing chloroform and acetone? Why is a decrease in vapour pressure observed on mixing chloroform and acetone?
31	Define the term: Mole fraction.
32	Write the structure of the major organic product of the reaction: $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{CH}_3 + \text{NaOH} \xrightarrow{\text{water}}$
33	How will you bring the conversion? Ethanol to ethyl fluoride?
34	How will you bring the conversion? Propene to propyne
35	Draw the structures of the major monohalo product for each of the following reactions: <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>6. </p> </div> <div style="text-align: center;"> <p>7. </p> </div> <div style="text-align: center;"> <p>8. </p> </div> </div>
36	How will you bring the conversion? Benzene to biphenyl.
Section C	

37	The density of 85% phosphoric acid is 1.70 g/cm^3 . What is the volume of a solution that contains 17 g of phosphoric acid?																											
38	Calculate the amount of benzoic acid ($\text{C}_6 \text{H}_5 \text{COOH}$) required for preparing 250 mL of 0.15 M solution in methanol.																											
39	Calculate the molarity of each of the following solutions: 7. 30 g of $\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ in 4.3 L of solution 8. 30 mL of 0.5 M H_2SO_4 diluted to 500 mL.																											
40	If the solubility product of CuS is 6×10^{-16} , calculate the maximum molarity of CuS in aqueous solution.																											
41	An antifreeze solution is prepared by dissolving 31 g of ethylene glycol (Molar mass = 62 g mol^{-1}) in 600 g of water. Calculate the freezing point of the solution. (K_f for water = $1.86 \text{ K kg mol}^{-1}$)																											
42	Nalorphene ($\text{C}_{19} \text{H}_{21} \text{NO}_3$), similar to morphine, is used to combat withdrawal symptoms in narcotic users. Dose of nalorphene generally given is 1.5 mg. Calculate the mass of $1.5 \times 10^{-3} \text{ m}$ aqueous solution required for the above dose.																											
43	A solution of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) in water is labelled as 10% by weight. What would be the molality of solution? (Molar mass of glucose = 180 g mol^{-1})																											
44	Calculate the mass percentage of benzene (C_6H_6) and carbon tetrachloride (CCl_4) if 22 g of benzene is dissolved in 122 g of carbon tetrachloride.																											
45	A solution is obtained by mixing 300 g of 25% solution and 400 g of 40% solution by mass. Calculate the mass percentage of the resulting solution.																											
46	Calculate the molarity and molality of a 15% solutions (by weight) of sulphuric acid density 1.020 g cm^{-3} (Atomic mass H = 1, O = 16, S = 32 amu).																											
47	Calculate elevation of the boiling point of the solution when 4 g of MgSO_4 (molar mass = 120 g/mol) was dissolved in 100 g of water, assuming MgSO_4 undergoes complete ionisation. (K_b for water = $0.52 \text{ K kg mol}^{-1}$)																											
48	A weak electrolyte AB in 5% dissociated in aqueous solution? What is the freezing point of a 0.10 molar aqueous solution of AB? $K_f = 1.86 \text{ deg/molal}$?																											
49	Vapour pressure of pure acetone and chloroform at 328 K are 741.8 mm Hg and 632.8 mm Hg respectively. Assuming that they form an ideal solution over the entire range of composition. Plot P_{total} , $P_{chloroform}$, and $P_{acetone}$ as a function of $x_{acetone}$. The experimental data observed for different compositions of the mixture is <table border="1" data-bbox="121 903 763 1123"> <tbody> <tr> <td>100x $x_{acetone}$</td> <td>0</td> <td>11.8</td> <td>23.4</td> <td>36.0</td> <td>50.8</td> <td>58.2</td> <td>64.5</td> <td>72.1</td> </tr> <tr> <td>$P_{acetone}$ /mm Hg</td> <td>0</td> <td>54.9</td> <td>110.1</td> <td>202.4</td> <td>322.7</td> <td>405.9</td> <td>454.1</td> <td>521.1</td> </tr> <tr> <td>$P_{chloroform}$ /mm Hg</td> <td>632.8</td> <td>548.1</td> <td>469.4</td> <td>359.7</td> <td>257.7</td> <td>193.6</td> <td>161.2</td> <td>120.7</td> </tr> </tbody> </table> <p>Plot the above data also on the same graph paper. Indicate whether it has a positive deviation or negative deviation from the ideal solution.</p>	100x $x_{acetone}$	0	11.8	23.4	36.0	50.8	58.2	64.5	72.1	$P_{acetone}$ /mm Hg	0	54.9	110.1	202.4	322.7	405.9	454.1	521.1	$P_{chloroform}$ /mm Hg	632.8	548.1	469.4	359.7	257.7	193.6	161.2	120.7
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50	State Henry's law and mention some of its important applications.																											
51	State Henry's law and mention some important applications?																											
52	How the following conversions can be carried out? 9. 2 - Bromopropane to 1 - bromopropane 10. Chloroethane to butane 11. Benzene to diphenyl																											
53	How can you convert the following? 12. But - 1 - ene to 1 - iodobutane 13. Benzene to acetophenone 14. Ethanol to propanenitrile																											
54	How the following conversions can be carried out? 15. 2 - Bromopropane to 1 - bromopropane 16. Chloroethane to butane 17. Benzene to diphenyl																											
55	How the following conversions can be carried out? 18. 2 - Methyl - 1 - propene to 2 - chloro - 2 - methylpropane 19. Ethyl chloride to propanoic acid 20. But - 1 - ene to n - butyliodide																											
56	Tert - Butylbromide reacts with aq. NaOH by S_N1 mechanism while n - butylbromide reacts by S_N2 mechanism. Why?																											
Section D																												
57	21. Draw the graph between vapour pressure and temperature and explain the elevation in boiling point of a solvent in solution. 22. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litres of water at 25°C assuming it to be completely dissociated. (Atomic masses K = 39 u, S = 32 u, O = 16 u)																											

58	Determine the amount of CaCl_2 ($i = 2.47$) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27°C .
59	Vapour pressure of water at 293 K is 17.535 mm Hg. Calculate the vapour pressure of water at 293 K when 25 g of glucose is dissolved in 450 g of water.
60	The vapour pressures of ethanol and methanol are 44.5 mm Hg and 88.7 mm Hg respectively. An ideal solution is formed at the same temperature by mixing 60 g of ethanol with 40 g of methanol. Calculate the total vapour pressure of the solution and the mole fraction of methanol in the vapour.
61	<p>23. Explain giving examples the term colligative molality. Why do we sometimes get abnormal molecular masses of the substances using colligative properties of the solutions?</p> <p>24. The freezing point depression of 0.1 molal solution of benzoic acid in benzene is 0.256 K. For benzene k_f is $5.12\text{ K kg mol}^{-1}$. Calculate the value of Van't Hoff factor for benzoic acid in benzene. What conclusion can you draw about the molecular state of benzoic acid in benzene.</p>
62	<p>The freezing point of a solution containing 0.2 g acetic acid in 20.0 g of benzene is lowered by 0.45°C.</p> <p>Calculate:</p> <p>25. the molar mass of acetic acid from this data</p> <p>26. van't Hoff factor. [For benzene, $K_f = 5.12\text{ K kg mol}^{-1}$] What conclusion can you draw from the value of van't Hoff factor obtained?</p>
63	<p>27. Define the term osmotic pressure. Describe how the molecular mass of a substance can be determined by a method based on measurement of osmotic pressure?</p> <p>28. 0.1 mole of acetic acid was dissolved in 1 kg of benzene. Depression in freezing point of benzene was determined to be 0.256 K. What conclusion can you draw about the state of the solute in solution? [Given: K_f for benzene = 5.1 K m^{-1}]</p>
64	<p>29. The vapour pressures of A and B at 25°C are 75 mm Hg and 25 mm Hg, respectively. If A and B are mixed such that the mole fraction of A in the mixture is 0.4, then calculate the mole fraction of B in vapour phase. (2)</p> <p>30. Define colligative property. Which colligative property is preferred for the molar mass determination of macromolecules? (2)</p> <p>31. Why are equimolar solutions of sodium chloride and glucose not isotonic? (1)</p>
65	Concentrated nitric acid used in laboratory work is 68% nitric acid by mass in aqueous solution. What should be the molarity of such a sample of the acid if the density of the solution is 1.504 g mL^{-1} ?
66	<p>32. Find the freezing point of a solution containing 0.520 g glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) dissolved in 80.2 g of water [Given: K_f for water = 1.86 K m^{-1}]</p> <p>33. A solution of glycerol ($\text{C}_3\text{H}_8\text{O}_3$) in water was prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of 100.420°C, what mass of glycerol was dissolved to make this solution? (K_b for water = $0.512\text{ K kg mol}^{-1}$)</p>
67	<p>34. Define reverse osmosis.</p> <p>35. Why are aquatic species more comfortable in cold water in comparison to warm water?</p> <p>36. A solution containing 2 g of glucose ($M = 180\text{ g mol}^{-1}$) in 100 g of water is prepared at 303 K. If the vapour pressure of pure water at 303 K is 32.8 mm Hg, what would be the vapour pressure of the solution?</p>
68	<p>37. Boiling point of water at 750 mm Hg pressure is 99.68°C. How much sucrose (Molar mass = 342 g mol^{-1}) is to be added to 500 g of water such that it boils at 100°C? (K_b for water = $0.52\text{ K kg mol}^{-1}$).</p> <p>38. State Henry's law and write its any one application.</p>
69	<p>Among the isomeric alkanes of molecular formula C_5H_{12}, identify the one that on photochemical chlorination yields</p> <p>39. A single monochloride.</p> <p>40. Three isomeric monochlorides.</p> <p>41. Four isomeric monochlorides.</p>
70	<p>Arrange each set of compounds in order of increasing boiling points.</p> <p>42. Bromomethane, Bromoform, Chloromethane, Dibromomethane.</p> <p>43. 1 - Chloropropane, Isopropyl chloride, 1 - Chlorobutane.</p>
71	<p>44. Which compound in each of the following pairs will react faster towards $\text{S}_\text{N}2$ reaction with - OH group?</p> <p>a. CH_3Br or CH_3I</p> <p>b. $(\text{CH}_3)_3\text{C-Cl}$ or $\text{CH}_3\text{-Cl}$</p> <p>45. Write the product(s) of the following reactions.</p> <p>a. $\text{CH}_3\text{-Cl} + \text{KCN} \rightarrow ?$</p> <p>b. </p>
72	<p>Predict all the alkenes that would be formed by dehydrohalogenation of the following halides with sodium ethoxide in ethanol and identify the major alkene:</p> <p>46. 1 - Bromo - 1 - methylcyclohexane</p> <p>47. 2 - Chloro - 2 - methylbutane</p> <p>48. 2,2,3 - Trimethyl - 3 - bromopentane.</p>

73 Which alkyl halide from the following pairs would you expect to react more rapidly by S_N2 mechanism? Explain.

49. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$ or $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{CH}_3$
50. $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{CH}_2\text{Br}$ or $\text{H}_3\text{C}-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{Br}$
51. $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{Br}$ or $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{Br}$