SAMPLE CONTENT

MHT-CET TEST SERIES

CHEMISTRY

WITH ANSWER KEY & SOLUTIONS

1530 MCQs

- **24** Topic Tests
- **08** Revision Tests
- **05** Model Test Papers

Cicutoxin, an alkadiyne, is a poisonous compound found in water hemlock.
$HO{-}(CH_2)_3{-}C{\equiv}C{-}C{\equiv}C{-}(C_{10}H_{14}){-}OH$

Target Publications® Pvt. Ltd.

Based on **Latest Paper Pattern** of MHT-CET prescribed by State Common Entrance Test Cell, Government of Maharashtra

MHT-CET
CHEMISTRY TEST SERIES
With Answer Key & Solutions

Salient Features:

- Contains 24 Topic Tests and 8 Revision Tests which cover MCQs from multiple different topics for efficient practice of MCQs.
- 5 Model Test Papers at the end for self-evaluation.
- Includes '1530' MCQs for practice in the form of Topic Test, Revision Test and Model Test Papers as per latest paper pattern.
- Answers provided to all the questions and Solutions for difficult questions.

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PREFACE

Target's **'MHT-CET Chemistry Test Series'** is a complete practice book, extremely handy for the preparation of MHT-CET examination. This book would act as a go-to tool for preparation and practice at the same time.

The core objective of the book is to help students gauge their preparedness to appear for MHT-CET examination, as it includes a beautiful assortment of MCQs in the form of Topic Tests and Revision Tests along with Model Test Papers as per latest paper pattern. Topic Tests are provided for powerful concept building.

Revision Tests develop confidence in the students, as it includes MCQs from three different topics. Model Test Papers would help students analyse their strengths and area of improvement to yield better results.

All Test Papers in this book have been created in line with the examination pattern and touches upon all the conceptual nodes of the subject.

We have provided answers to all the questions along with detailed solutions for difficult questions.

We are sure that, these question papers would provide ample practice to students in a systematic manner and would boost their confidence to face the challenges posed in examinations.

We welcome your valuable suggestions and feedback towards this book.

We wish the students all the best for their examinations!

- Publisher
Edition: First

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

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A book affects eternity; one can never tell where its influence stops.

NEW PAPER PATTERN

- There will be three papers of Multiple Choice Questions (MCQs) in 'Mathematics', 'Physics and Chemistry' and 'Biology' of 100 marks each. Duration of each paper will be 90 minutes.
- Questions will be based on the syllabus prescribed by Maharashtra State Board of Secondary and Higher Secondary Education with approximately 20% weightage given to Std. XI and 80% weightage will be given to Std. XII curriculum.
- Difficulty level of questions will be at par with JEE (Main) for Mathematics, Physics, Chemistry and at par with NEET for Biology.
- There will be no negative marking.
- Questions will be mainly application based.
- Details of the papers are as given below:

Paper	Subject(s)	No. of MCQs based on		Mark(s) Per Question	Total Marks	Duration in Minutes
		Std XI	Std XII			
Paper I	Mathematics	10	40	2	100	90
Paper II	Physics	10	40	1	100	90
	Chemistry	10	40			
Paper III	Biology	20	80	1	100	90

- **Chapters / units from Std. XI curriculum:**

Sr.no	Subject	Chapters/Units of Std. XI
1	Physics	Motion in a plane, Laws of Motion, Gravitation, Thermal properties of matter, Sound, Optics, Electrostatics, Semiconductors
2	Chemistry	Some Basic Concepts of Chemistry, Structure of Atom, Chemical Bonding, Redox Reactions, Elements of Group 1 and Group 2, States of Matter (Gaseous and Liquid States), Adsorption and Colloids (Surface Chemistry), Hydrocarbons, Basic Principles of Organic Chemistry
3	Mathematics	Trigonometry II, Straight Line, Circle, Measures of Dispersion, Probability, Complex Numbers, Permutations and Combinations, Functions, Limits, Continuity
4	Biology	Biomolecules, Respiration and Energy Transfer, Human Nutrition, Excretion and Osmoregulation

- **Language of Question Paper:**
  The medium for examination shall be English / Marathi / Urdu for Physics, Chemistry and Biology. Mathematics paper shall be in English only.
- **Duration of Examination:**
  The duration of the examination for PCB is 180 minutes and PCM is 180 minutes.

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Topic Test 01

Some Basic Concepts of Chemistry

Time: 40 min **Total Marks: 40**

1. Sample A of cupric carbonate was obtained from natural source and Sample B of cupric carbonate was synthesized in laboratory. The composition of the elements present in both the samples was same. This is in accordance with the _______.
   (A) law of multiple proportions
   (B) Avogadro's law
   (C) Gay Lussac's law of gaseous volume
   (D) law of definite proportions

2. Identify the INCORRECT statement.
   (A) The symbol used for the SI unit of length is 'm'.
   (B) The SI unit of mass is kilogram.
   (C) In MKS system, the unit for time is minute.
   (D) The SI unit of electric current is ampere.

3. The formula mass of potassium bromide is _______ u.
   [Given: Atomic mass of K = 39.1 u, Br = 79.9 u]
   (A) 129.0 (B) 109.0
   (C) 119.0 (D) 198.9

4. What mass of carbon is present in 0.5 mole of potassium ferrocyanide ($K_4[Fe(CN)_6]$)?
   (A) 72 g (B) 36 g
   (C) 3.6 g (D) 7.2 g

5. A balloon contains 10.0 g of helium (He). The number of atoms of He present in the balloon is:
   (A) 6.0×10^{23} (B) 1.5×10^{24}
   (C) 6.0×10^{24} (D) 1.5×10^{23}

6. Identify the CORRECT statements from the following.
   (I) Mixtures can be separated by physical methods.
   (II) Compounds are made up of two or more elements in fixed proportion.
   (III) Elements can be broken down into simpler substances by ordinary chemical changes.
   (A) I, II (B) II, III
   (C) I, III (D) I, II, III

7. At STP, _____ mol of neon (Ne) gas occupies a volume of 2.24 dm^3.
   (A) 10 (B) 0.01 (C) 1.0 (D) 0.1

8. Which of the following pair has equal numbers of molecules?
   (A) 4 g of H_2 and 18 g of H_2O
   (B) 36 g of H_2O and 2 g of H_2
   (C) 18 g of H_2O and 2 g of H_2
   (D) 32 g of CH_4 and 18 g of H_2O

9. Convert 100 °C temperature to degree Fahrenheit.
   (A) 200 °F (B) 212 °F
   (C) 222 °F (D) 273 °F

10. The number of sulphur atoms present in 0.50 moles of S_8 molecules is _______.
    (A) 2.4×10^{24} (B) 6.0×10^{23}
    (C) 1.4×10^{23} (D) 3.0×10^{23}

11. Identify the INCORRECT match from following.
    (A) Mercury: Element
    (B) Gasoline: Mixture
    (C) Distilled water: Mixture
    (D) Sodium chloride: Compound

12. The simplest ratio of volumes of gases at the same temperature and pressure for the following reaction will be _______.
    $\text{Sulphur dioxide}_{(g)} + \text{Oxygen}_{(g)} \longrightarrow \text{Sulphur trioxide}_{(g)}$
    (A) 1: 2 : 1 (B) 2: 3 : 2
    (C) 2: 1 : 2 (D) 3: 2 : 3

13. Select the CORRECT statement regarding Dalton's atomic theory.
    (A) Chemical reactions involve only reorganization of atoms.
    (B) Matter consists of tiny, indivisible particles called molecules.
    (C) Atoms are created in a chemical reaction.
    (D) It could not explain all the laws of chemical combination.

14. Value of 1 amu is equal to ________.
    (A) one tenth of the mass of one carbon-12 atom
    (B) one twelfth of the mass of one carbon -12 atom
    (C) one fifth of the mass of one oxygen-16 atom
    (D) the mass of one carbon-12 atom

15. Nitrogen combines with oxygen to form, NO and NO_2. In these two compounds, oxygen combines with the fixed mass of nitrogen and bear a simple ratio of small whole numbers 1 : 2. This data is in accordance with ______.
    (A) law of definite proportions
    (B) law of multiple proportions
    (C) law of conservation of mass
    (D) Gay Lussac's law

Page no. **2** to **9** are purposely left blank.

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Revision Test 01

Topic Test – 01, 02, 03

Time: 40 min **Total Marks: 40**

1. A sample of sodium has a mass of 46.0 g. What is the mass of the same number of potassium atoms?
[Molar mass of Na = 23 g mol^{-1}, K = 39 g mol^{-1}]
(A) 23 g (B) 39 g
(C) 46 g (D) 78 g

2. In mist, the disperse phase and dispersion medium are _______ respectively.
(A) liquid and gas (B) gas and liquid
(C) gas and solid (D) solid and gas

3. Density of a gas at 27 °C is 2.5 g dm^{-3} and the corresponding pressure is 2 atm. Find out the density of gas (in g dm^{-3}) at 0 °C and 1 atm.
(A) 0.73 (B) 1.37
(C) 1.09 (D) 1.55

4. Which of the following is TRUE for the phenomenon that occurs when a piece of cotton is dipped in water?
(A) It is dependent of temperature and pressure.
(B) It is a surface phenomenon.
(C) It is independent of surface area of cotton.
(D) It is accompanied with evolution of heat.

5. From 100 mg of methane (CH_4), 10^{20} molecules are removed. How many moles of CH_4 are left?
(A) 6.08×10^{-3} (B) 1.66×10^{-4}
(C) 6.25×10^{-3} (D) 6.41×10^{-3}

6. The combining ratios of hydrogen and oxygen in water and hydrogen peroxide are 1:8 and 1:16. Which law is illustrated in this example?
(A) Law of definite proportions
(B) Gay Lussac's law of combining volumes of gases
(C) Law of conservation of mass
(D) Law of multiple proportions

7. Electrophoresis is used to measure the ______.
(A) number of particles in colloidal system and their particle size
(B) wavelength of light scattered by dispersed particles
(C) refractive index of dispersion medium
(D) rate of migration of sol particles under the influence of electric field

8. What is CORRECT about vapour pressure and viscosity of a liquid?
(A) Both increase with temperature.
(B) Both decrease with temperature.
(C) Vapour pressure increases whereas viscosity decreases with temperature.
(D) Vapour pressure decreases whereas viscosity increases with temperature.

9. No. of moles of a gas = $\dfrac{\text{Volume of gas at STP}}{x}$
The term 'x' is _______.
(A) 22.4 dm^3 mol^{-1}
(B) Avogadro number
(C) 1.66×10^{-27} kg
(D) Molar mass of the gas in g mol^{-1}

10. Convert 65 °F temperature to degree Celsius.
(A) 18.33 °C (B) 338 °C
(C) 59.4 °C (D) –18.33 °C

11. Which of the following statements is INCORRECT?
(A) Heterogeneous catalyst does not dissolve in the reacting mixture.
(B) Homogenous catalyst cannot be easily separated from the products of reaction.
(C) Homogeneous catalyst is generally a solid and the reactants may either be gases or liquids.
(D) Heterogeneously catalysed reactions occur on the surface of the solid catalyst.

12. The number of atoms present in 0.05 g of water is _______.
(A) 1.67×10^{23} (B) 1.67×10^{22}
(C) 5.05×10^{21} (D) 1.67×10^{21}

13. Gradation of lubricating oils is done on the basis of ______.
(A) viscosity
(B) surface tension
(C) vapour pressure
(D) compressibility factor

14. The mass of one atom of carbon = _______.
[Atomic mass of C = 12 u]
(A) $\dfrac{12}{N_A}$ (B) $\dfrac{1}{N_A}$
(C) $12 \times N_A$ (D) $\dfrac{N_A}{12}$

15. In which of the following, the main intermolecular forces present is dipole-dipole interactions?
(A) CCl_4 (B) $CHCl_3$
(C) He (D) CH_4

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Model Test Paper - 01

Time: 45 min **Total Marks: 50**

1. Which among the following pairs of proteins is soluble in water?
(A) Insulin and egg albumin
(B) Legumelin and myosin
(C) Keratin and serum albumin
(D) Insulin and myosin

2. Arrange the following compounds in order of their increasing boiling points.
CH_3OH (i) $CH_3(CH_2)_4CH_2OH$ (ii)
$CH_3(CH_2)_3CH_2OH$ (iii) $CH_3(CH_2)_2OH$ (iv)
(A) ii < iii < iv < i (B) i < iv < iii < ii
(C) iv < ii < iii < i (D) i < iii < iv < ii

3. Which of the following is a mineral of iron?
(A) Siderite (B) Cuprite
(C) Chalcocite (D) Calamine

4. Which of the following is CORRECT for benzylic halides?
(A) Halogen atom is bonded to a sp^3 hybridized carbon atom which is further bonded to an aromatic ring.
(B) Halogen atom is bonded to a sp^2 hybridized carbon atom which is further bonded to an aromatic ring.
(C) Halogen atom is bonded to a sp^3 hybridized carbon atom which is further bonded to an aliphatic carbon.
(D) Halogen atom is bonded to a sp^2 hybridized carbon atom which is further bonded to an aliphatic carbon.

5. _______ is made from only one type of monomer.
(A) Polyacrylamide
(B) Polycarbonate
(C) Glyptal
(D) Buna-N

6. Which of the following will have maximum boiling point?
(A) Propionic acid
(B) Acetic acid
(C) Propanal
(D) Propan-1-ol

7. Which of the following is a primary voltaic cell?
(A) Lead storage battery
(B) Nickel-cadmium cell
(C) Leclanche' cell
(D) Mercury cell

8. The carbon atom of methyl carbocation is ______ hybridized and has ______ geometry.
(A) sp^2, trigonal planar
(B) sp^3, trigonal planar
(C) sp^3, tetrahedral
(D) sp^2, tetrahedral

9. Identify the mixture that shows positive deviation Raoult's law.
(A) $(CH_3)_2CO$
(B) $CHCl_3 + (CH_3)_2CO$
(C) $C_6H_5OH + C_6H_5NH_2$
(D) $C_6H_6 + C_6H_5CH_3$

10. In an elementary reaction $2A + 2B \longrightarrow C$, the molecularity of the reaction is _______.
(A) 2 (B) 3
(C) 4 (D) 5

11. According to the Arrhenius theory, base is a substance that _______.
(A) gives H^+ ions in aqueous solution
(B) gives OH^- ions in aqueous solution
(C) contains OH group
(D) accepts an electron pair

12. A metal crystallizes in a body centred cubic (bcc) structure. If 'a' is the edge length of its unit cell, 'r' is the radius of the sphere. What is the relationship between 'r' and 'a'?
(A) $r = \frac{\sqrt{3}}{4}a$ (B) $r = \frac{\sqrt{3}}{\sqrt{2}}a$
(C) $r = \frac{\sqrt{2}}{4}a$ (D) $r = \sqrt{3}\,a$

13. In Castner-Kellner cell, anode and cathode are _______ respectively.
(A) mercury and platinum
(B) sodium and mercury
(C) carbon and platinum
(D) carbon and mercury

14. The vapour pressure of two liquids P and Q are 100 and 50 torr respectively. The total vapour pressure of solution obtained by mixing 3 moles of P and 2 moles of Q would be:
(A) 140 torr (B) 20 torr
(C) 68 torr (D) 80 torr

Page no. 96 to **111** are purposely left blank.

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Topic Test - 01

1. **(D)**

2. **(C)**
In MKS system, the unit for time is second.

3. **(C)**
Formula mass of KBr
= Atomic mass of K + Atomic mass of Br
= 39.1 u + 79.9 u = 119.0 u

4. **(B)**
Potassium ferrocyanide = $K_4[Fe(CN)_6]$
1 mole $K_4[Fe(CN)_6]$ = 6 mol of carbon
$\therefore$ 0.5 mol $K_4[Fe(CN)_6]$ = 3 mol carbon
= 3 × 12 g carbon
= 36 g carbon

5. **(B)**
Molar mass of He = 4 g mol^{-1};
Amount of He = 10.0 g
$\therefore$ Number of moles of He = $\frac{10.0}{4}$ = 2.5 mol
1 mol of He = 6.022×10^{23} atoms
$\therefore$ 2.5 mol of He = $\frac{2.5 \times 6.022 \times 10^{23}}{1}$
= 1.5055×10^{24} atoms
$\approx 1.5 \times 10^{24}$ atoms

6. **(A)**

7. **(D)**
One mole of any gas occupies a volume of 22.4 dm^3 at STP.
Therefore, 0.1 mol of any gas will occupy a volume of 2.24 dm^3 at STP.

8. **(C)**

Amount	No. of moles	No. of molecules
2 g of H_2	1 mole	$1 \times N_A$
18 g of H_2O	1 mole	$1 \times N_A$
32 g of CH_4	2 moles	$2 \times N_A$
4 g of H_2	2 moles	$2 \times N_A$
36 g of H_2O	2 moles	$2 \times N_A$

$\therefore$ Equal numbers of molecules are present in 18 g of H_2O and 2 g of H_2.

9. **(B)**
$°F = \frac{9}{5}(°C) + 32$
$= \frac{9}{5}(100) + 32 = 180 + 32 = 212\ °F$

10. **(A)**
Number of atoms = n × N_A × No. of atoms in one molecule
$\therefore$ Number of S atoms = $0.5 \times 6.022 \times 10^{23} \times 8$
= 2.4×10^{24}

11. **(C)**
Distilled water: Compound

12. **(C)**
According to Gay Lussac's law under the same conditions of temperature and pressure,

$$\underset{\substack{[2\ L] \\ [2\ vol]}}{2SO_{2(g)}} + \underset{\substack{[1\ L] \\ [1\ vol]}}{O_{2(g)}} \longrightarrow \underset{\substack{[2\ L] \\ [2\ vol]}}{2SO_{3(g)}}$$

The simple ratio of volumes of gases is 2: 1 : 2.

13. **(A)** 14. **(B)** 15. **(B)**

16. **(B)**
In 11 g $^{23}_{11}Na$,
number of moles of Na = $\frac{11}{23}$ = 0.48 mol
$\therefore$ Number of Na atoms = $0.48 \times N_A$
In 1.92 g CH_4,
number of moles of CH_4 = $\frac{1.92}{16}$ = 0.12 mol
1 mol CH_4 = 4 mol H-atoms
$\therefore$ Number of hydrogen atoms in 1.92 g CH_4
= $0.12 \times 4 \times N_A = 0.48 \times N_A$

17. **(A)**
Molecular mass of CH_3CHO
= (2 × Average atomic mass of C)
+ (4 × Average atomic mass of H)
+ (1 × Average atomic mass of O)
= (2 × 12.0 u) + (4 × 1.0 u) + (1 × 16.0 u)
= 44 u

18. **(C)**
1 mol of Ne = 22.4 L (at STP)
16 g of CH_4 = 1 mol CH_4
$\therefore$ 32 g of CH_4 = 2 × 22.4 L = 44.8 L (at STP)
4 g of He = 1 mol He
$\therefore$ 0.4 g He = 0.1 × 22.4 L = 2.24 L (at STP)
0.3 mol of SO_2 = 0.3 × 22.4 L = 6.72 L (at STP)
$\therefore$ 0.4 g He occupies the least volume at STP.

19. **(D)**
Molecular formula of acetic acid : $C_2H_4O_2$
Moles of acetic acid = 5 mol
i. Number of moles of carbon atoms
= Moles of acetic acid × Number of carbon atoms
= 5 × 2
= 10 moles of carbon atoms
ii. Number of moles of hydrogen atoms
= Moles of acetic acid
× Number of hydrogen atoms
= 5 × 4 = 20 moles of hydrogen atoms

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Revision Test - 01

1. **(D)**

Number of moles (n) = $\frac{\text{Mass of substance}}{\text{Molar mass}}$

$\therefore$ $n = \frac{46.0}{23} = 2$ mol

$\therefore$ Mass of K-atoms = 2 × Molar mass of K
= 2 × 39
= 78 g

2. **(A)**

3. **(B)**
$d_1 = 2.5$ g dm^{-3}, $T_1 = 27$ °C = 300 K, $P_1 = 2$ atm,
$T_2 = 273$ K, $P_2 = 1$ atm, d_2 = ?

$\frac{d_1\ T_1}{P_1} = \frac{d_2\ T_2}{P_2}$

$\therefore$ $d_2 = \frac{d_1\ T_1\ P_2}{P_1\ T_2} = \frac{2.5 \times 300 \times 1}{2 \times 273} = 1.37$ g cm^{-3}

4. **(C)**

5. **(A)**
Molar mass of CH_4 = 16 g mol^{-1}
100 mg CH_4 = 0.1 g CH_4
$= \frac{0.1}{16} = 6.25 \times 10^{-3}$ mol CH_4

1 mol CH_4 = 6.022×10^{23} molecules

$\therefore$ 10^{20} molecules = $\frac{10^{20}}{6.022 \times 10^{23}} = 1.66 \times 10^{-4}$ mol CH_4

$\therefore$ CH_4 left = $6.25 \times 10^{-3} - 1.66 \times 10^{-4}$
= 6.08×10^{-3} mol CH_4

6. **(D)** **7.** **(D)**

8. **(C)**
Vapour pressure $\propto$ Temperature

Viscosity $\propto \frac{1}{\text{Temperature}}$

9. **(A)**

10. **(A)**

°F = $\frac{9}{5}$ (°C) + 32

65 = $\frac{9}{5}$ (°C) + 32

°C = $\frac{(65 - 32) \times 5}{9}$ = 18.33 °C

11. **(C)**

12. **(C)**
Total number of atoms in a given amount of
$H_2O = n \times N_A \times 3$
$= \frac{0.05}{18} \times 6.022 \times 10^{23} \times 3$
$= 5.05 \times 10^{21}$

13. **(A)** **14.** **(A)** **15.** **(B)**

16. **(C)**
Mixture of any two liquids may be homogeneous or heterogeneous mixtures.

17. **(D)**

18. **(B)**
Volume is 2240 dm^3, so the number of moles of ammonia in this case = $\frac{2240}{22.4}$ = 100 moles

$\therefore$ Number of molecules of ammonia
= $6.022 \times 10^{23} \times 100 = 6.022 \times 10^{25}$ molecules.

19. **(D)**

$$\underset{\substack{32\text{ g} \\ (1\text{ mol})}}{S} + \underset{\substack{32\text{ g} \\ (1\text{ mol})}}{O_2} \longrightarrow \underset{\substack{64\text{ g} \\ (1\text{ mol})}}{SO_2}$$

$\therefore$ 32 g sulphur gives 64 g SO_2.

$\therefore$ 2.0 g sulphur will give $\frac{2.0 \times 64}{32} = 4.0$ g SO_2

20. **(B)**
Tyndall effect is not observed in salt solution, as it is true solution.

21. **(A)**
0.1 mol Fe = 56 × 0.1 = 5.6 g
0.2 mol Na = 23 × 0.2 = 4.6 g
0.5 mol He = 4 × 0.5 = 2.0 g
0.1 mol K = 39 × 0.1 = 3.9 g

22. **(B)**
–3 °C = 270 K
27 °C = 300 K
V $\propto$ T

$\therefore$ $\frac{V_1}{T_1} = \frac{V_2}{T_2}$

$\therefore$ $\frac{200 \text{ dm}^3}{300 \text{ K}} = \frac{V_2}{270 \text{ K}}$

$\therefore$ $V_2 = \frac{270 \text{K} \times 200 \text{ dm}^3}{300 \text{ K}} = 180$ dm^3

23. **(C)**
Macromolecular colloids: Cellulose, plastics
Associated colloids or micelles: Soaps
Multimolecular colloids: Gold

24. **(B)**
Molar mass of NO_2 = 46 g mol^{-1}
Volume occupied by 1 mole of any gas at STP = 22.4 dm^3

$\therefore$ 22.4 dm^3 of NO_2 gas = 46 g (at STP)

$\therefore$ 10 dm^3 of NO_2 gas = $\frac{46 \times 10}{22.4}$
= 20.5 g of NO_2 gas

Page no. **118** to **174** are purposely left blank.

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Model Test Paper - 01

1. **(A)**
Globular proteins (insulin, egg albumin, serum albumin, legumelin) are usually soluble in water. Fibrous proteins (keratin, myosin) are insoluble in water.

2. **(B)** **3.** **(A)** **4.** **(A)**

5. **(A)**
Polyacrylamide is made from the monomer unit, acrylamide.

6. **(A)**
Carboxylic acids have higher boiling points than those of alcohols, aldehydes and ketones of comparable molar mass. As the molar mass increases, boiling point increases.

7. **(C)**
Dry cell or Leclanche' cell is a primary voltaic cell.

8. **(A)** **9.** **(A)** **10.** **(C)**

11. **(B)** **12.** **(A)** **13.** **(D)**

14. **(D)**
Mole fraction of P = $\frac{3}{3+2} = \frac{3}{5}$
Mole fraction of Q = $\frac{2}{3+2} = \frac{2}{5}$
Hence,
Total vapour pressure, $P_T = P_1^0 x_1 + P_2^0 x_2$
$= 100 \times \frac{3}{5} + 50 \times \frac{2}{5} = 80$ torr

15. **(D)** **16.** **(A)** **17.** **(C)**

18. **(D)**
Action of neutral ferric chloride ($FeCl_3$) is a distinguishing test (colour test) between phenols and alcohols.

Phenol or Catechol + aq./neutral $FeCl_3 \longrightarrow$ Violet colour

Ethanol or Methanol + aq./neutral $FeCl_3 \longrightarrow$ No colouration

19. **(A)**
Lower is the reduction potential, greater is the reducing power. Hence, the increasing order of reducing power is B < C < A.

20. **(C)**

21. **(D)**
For a tetraatomic gas, 1 molecule has 4 atoms.
∴ 1 mol of gas ≡ $4 \times N_A$ atoms
∴ 7 mol of gas = $7 \times 4 \times N_A$ atoms
= $28\ N_A$ atoms

22. **(D)**

23. **(B)**
m_l has seven values, so $m_l = -2, -1, 0, +1, +2$. Hence, l should be 2.
<u>Alternate method:</u>
The relationship between m_l and l is given by:
$m_l = 2l + 1$
$5 = 2l + 1$
$4 = 2l$
$l = \frac{4}{2} = 2$

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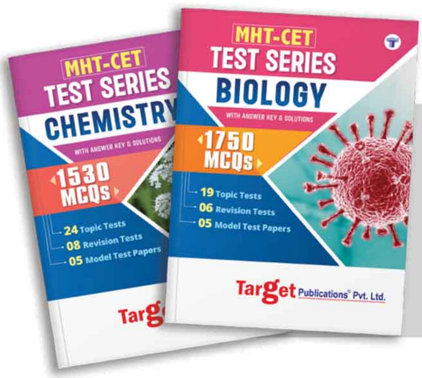

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