MHT-CET®

TEST SERIES

CHEMISTRY

WITH ANSWER KEY & SOLUTIONS

1530 MCQs

24	Topic Tests
08	Revision Tests
05	Model Test Papers
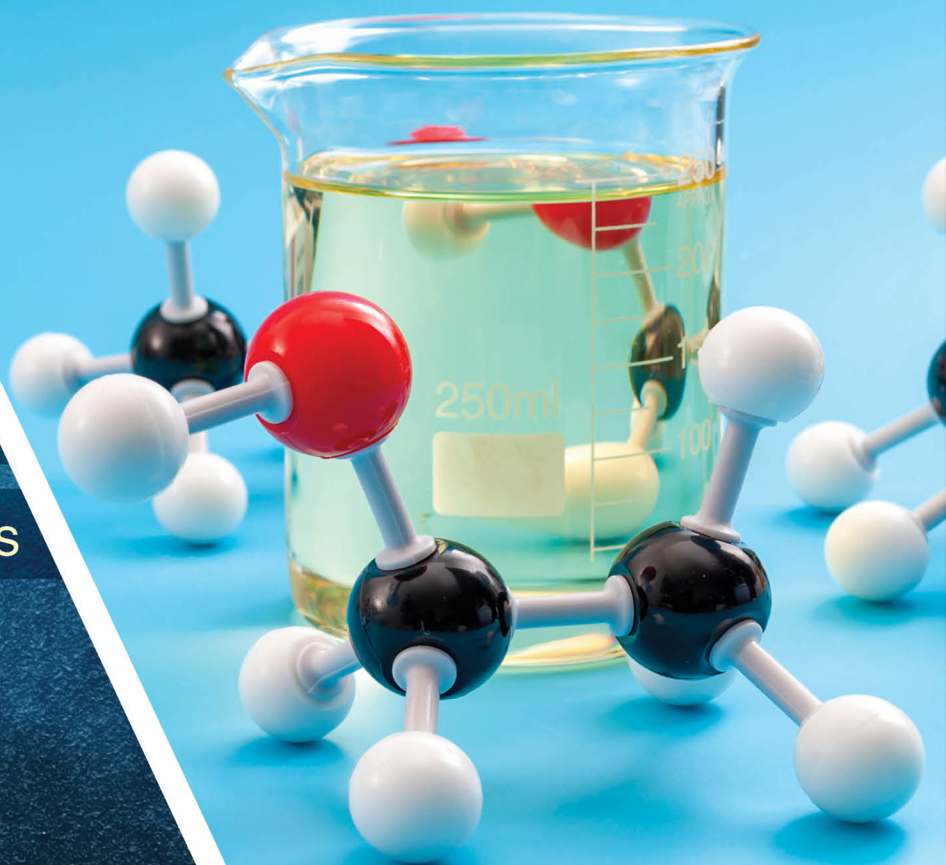
Target Publications® Pvt. Ltd.

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

MHT-CET
TEST SERIES
CHEMISTRY

1530 MCQs

WITH ANSWER KEY & SOLUTIONS

Salient Features

- Includes '**1530**' MCQs for practice in the form of:
  - *24 Topic Tests*
  - *8 Revision Tests*
  - *5 Model Tests*

- Contains a variety of questions, formulated through a comprehensive analysis of all MHT-CET 2023 examination papers.

- Answers provided to all the questions

- Solutions provided for difficult questions

Printed at: **India Printing Works,** Mumbai

PREFACE

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

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 the latest paper pattern.

- **Topic Tests** are provided for powerful concept building.
- **Revision Tests** develop confidence in the students as it includes MCQs from different topics**.**
- **Model Tests** help students to improve their performance in chemistry by analyzing their strengths and shortcomings.

MCQs are meticulously curated after a thorough analysis of the MHT-CET 2023 Examination (all shift question papers). The compilation of diverse question types serves as an invaluable resource for exam preparation. This also aligns with the learning objectives, subject matter and cognitive skills expected of MHT-CET aspirants.

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: Second

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.

Please write to us on : mail@targetpublications.org

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

- Questions will be set on
  i. the entire syllabus of Std. XII of Physics, Chemistry, Mathematics and Biology subjects prescribed by Maharashtra Bureau of Textbook Production and curriculum Research, Pune, and
  ii. chapters / units from Std. XI curriculum as mentioned below:

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 Online Computer Based Test (CBT):**
  The duration of the examination for PCB is 180 minutes and PCM is 180 minutes.
  a. **For PCM** - This paper is having 2 Groups of Physics-Chemistry and Mathematics with total 180 Minutes Duration, first 90 minutes Physics and Chemistry will be enabled and only after completion of first 90 minutes' time Physics-Chemistry group will be auto submitted and Mathematics group will be enabled with 90 minutes' duration.
  b. **For PCB** - This paper is having 2 Groups of Physics-Chemistry and Biology with total 180 Minutes Duration, first 90 minutes Physics and Chemistry will be enabled and only after completion of time response for Physics-Chemistry group will be auto submitted and Biology group will be enabled with 90 minutes' duration.

[Note: Candidate should note that if he/she appearing for both the groups i.e. PCM and PCB, the Percentile / Percentage score of Physics or Chemistry will not be interchanged among the groups.**]**

INDEX

Time: 40 min

Total Marks: 40

1. Match the following:

Volume at STP (L)		Moles of gas	
i.	22.4	a.	4 moles of H_2
ii.	2.5	b.	3.5 moles of CO_2
iii.	89.6	c.	0.112 moles of N_2
iv.	78.4	d.	1 mol of He

(A) i – d, ii – b, iii – a, iv – c
(B) i – d, ii – c, iii – a, iv – b
(C) i – c, ii – b, iii – a, iv – d
(D) i – a, ii – c, iii – d, iv – b

2. What will be volume occupied by 20 g H_2 gas at STP?
(A) $22.4 \, dm^3$ (B) $112 \, dm^3$
(C) $224 \, dm^3$ (D) $448 \, dm^3$

3. A sample of ethane (C_2H_6) has the same mass as 10^7 molecules of methane. How many C_2H_6 molecules does the sample contain?
(A) 5.33×10^6 (B) 1.87×10^6
(C) 5.33×10^7 (D) 1.87×10^7

4. What amount of dioxygen (in gram) contains 1.8×10^{22} molecules?
(A) 0.0960 (B) 0.960
(C) 9.60 (D) 96.0

5. The ratio of number of moles in 10 g of CO_2 and 10 g of N_2O is _____.
(A) 1 : 1 (B) 2 : 1
(C) 1 : 2 (D) 2 : 3

6. A 3.0 L container is filled with Neon gas (Ne) at STP. Calculate the number of neon atoms present in the container.
(A) 8.056×10^{21} (B) 8.066×10^{22}
(C) 6.023×10^{23} (D) 80.66×10^{22}

7. Carbon monoxide reacts with oxygen to form carbon dioxide. If 56 g of carbon monoxide reacts with 32 g of oxygen, then mass of carbon dioxide formed will be _____.
(A) 32 g (B) 56 g
(C) 44 g (D) 88 g

8. Mass of one million copper atoms is equal to _____.
[$N_A = 6.0 \times 10^{23}$, At. Mass of Cu = 63.5 u]
(A) 9.449×10^{-22} g
(B) 9.449×10^{-16} g
(C) 1.058×10^{-22} g
(D) 1.058×10^{-16} g

9. The mass of a cadmium atom is _____ than the mass of a carbon atom.
[Atomic mass of cadmium = 112 u]
(A) 9.33 times heavier
(B) 0.933 times heavier
(C) 9.33 times lighter
(D) 1.07 times heavier

10. Which of the following occupies the largest volume at STP.
(A) 1 mol of He (B) 1 mol of H_2
(C) 2 mol of N_2 (D) 2.5 mol of CO_2

11. 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

12. 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.

13. 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

14. 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

15. 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}

16. 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

17. 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

18. 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

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

20. 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}

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

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

23. 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.

24. Calculate the mass of a single oxygen atom in kilograms.
(A) 16 g
(B) 2.6568×10^{-27} kg
(C) 1.66×10^{-24} kg
(D) 26.568×10^{-27} kg

25. 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

26. The number of Na atoms in 11 g of $^{23}_{11}Na$ is equal to the number of _____.
(A) oxygen atoms in 32 g of O_2
(B) hydrogen atoms in 1.92 g of CH_4
(C) hydrogen atoms in 44 g of HCl
(D) nitrogen atoms in 56 g of NO_2

27. The molecular mass of CH_3CHO is _____.
(A) 44 u　　　　(B) 54 u
(C) 64 u　　　　(D) 34 u

28. Which of the following will occupy least volume at STP?
(A) 1 mol of Ne　　(B) 32 g of CH_4
(C) 0.4 g of He　　(D) 0.3 mol of SO_2

29. In five moles of acetic acid (CH_3COOH), number of moles of carbon atoms and number of moles of hydrogen atoms are _____ respectively.
(A) 2 , 4　　　　(B) 20 , 10
(C) 5 , 10　　　　(D) 10 , 20

30. The number of molecules of ammonia in 112.0 dm^3 of ammonia gas at STP is _____.
(A) 3.011×10^{24}　　(B) 18.066×10^{23}
(C) 3.011×10^{23}　　(D) 6.022×10^{24}

31. 'x' g of a diatomic gas at STP occupies a volume of 2.24 dm^3. The molar mass of the gas is _____ g mol^{-1}.
(A) $\dfrac{x}{10}$　　　　(B) $10x$
(C) $\dfrac{x}{2}$　　　　(D) x

32. What is the ratio of number of oxygen atoms in 0.1 mol HNO_3 and 0.5 mol $CuSO_4$?
(A) 1 : 5　　　　(B) 3 : 4
(C) 1 : 15　　　　(D) 3 : 20

33. 33.6 cm^3 of oxygen (O_2) gas at STP contains _____ moles of oxygen gas.
(A) 1.5×10^3　　(B) 2.0×10^{-3}
(C) 2.5×10^3　　(D) 1.5×10^{-3}

34. The weight of a molecule of the compound $C_{60}H_{22}$ is :
(A) 1.232×10^{-21} g　(B) 7.42×10^{-23} g
(C) 1.232×10^{-23} g　(D) 7.42×10^{-21} g

35. 15.5 g of CH_3NH_2 contains _____.
(A) 0.5 mol of C-atoms, 0.5 mol of N-atoms and 0.5 mol of H-atoms
(B) 0.5 mol of C-atoms, 2.5 mol of N-atoms and 2.5 mol of H-atoms
(C) 0.5 mol of C-atoms, 0.5 mol of N-atoms and 2.5 mol of H-atoms
(D) 1.5 mol of C-atoms, 1.5 mol of N-atoms and 2.5 mol of H-atoms

36. The number of atoms present in 96 u of oxygen (O) atoms is _____.
(A) 4   (B) 6
(C) 7   (D) 8

37. Two cylinders of the same volume are filled separately with CH_4 gas and SO_2 gas. Both the containers under the same T and P will contain the same _____.
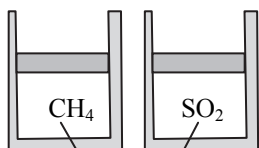
CH₄   SO₂
Same volume

(A) number of atoms
(B) weight of gas
(C) number of molecules
(D) number of electrons

38. Which of the following is an example of compound?
(A) Water   (B) Concrete
(C) Sea water   (D) Diamond

39. At STP, 4.4 g of argon gas occupies a volume of _____. [At. Mass of Ar = 40 u]
(A) 1.232 dm^3 (B) 2.036 dm^3
(C) 2.464 dm^3 (D) 4.928 dm^3

40. What will be the approximate number of nitrogen atoms in 24 g of $Cr(NO_3)_3$?
(Molar mass of $Cr(NO_3)_3 = 238 \text{ g mol}^{-1}$).
(A) 1.8×10^{23} atoms
(B) 6.0×10^{22} atoms
(C) 3.2×10^{19} atoms
(D) 5.4×10^{23} atoms

Page no. **4** to 21 are purposely left blank.

To see complete chapter buy **Target Notes** or **Target E-Notes**

Time: 40 min   Total Marks: 40

1. Which of the following molecules in linear?
    (A) H_2O (B) NH_3
    (C) C_2H_2 (D) CH_4

2. The ratio of radii of third and second Bohr's orbits of H-atom is _____.
    (A) 3 : 2   (B) 9 : 4
    (C) 9 : 1   (D) 2 : 9

3. Identify the CORRECT statement.
    (A) Geometry of H_2O molecule is angular with H–O–H bond angle equal to 104°35′.
    (B) Geometry of NH_3 molecule is trigonal planar with H–N–H bond angle equal to 120°.
    (C) Geometry of H_2O molecule is angular with H–O–H bond angle equal to 109°28′.
    (D) Geometry of NH_3 molecule is pyramidal with H–N–H bond angle equal to 109°28′.

4. The number of unpaired electrons in Cr^{2+} is ion _____.
    (A) 1   (B) 2   (C) 3   (D) 4

5. Which of the following is TRUE about formal charges?
    (A) The formal charge is based on a pure ionic bonding.
    (B) The structure having the lowest formal charge has the lowest energy.
    (C) The formal charge cannot be assigned for atoms of polyatomic species.
    (D) To calculate the formal charge, lone pairs of electrons are not required.

6. Which one of the following is the CORRECT set with respect to molecule, hybridization and shape?
    (A) BeF_2, sp^2, linear
    (B) BCl_3, sp^3, tetrahedral
    (C) CH_4, sp^2, trigonal planar
    (D) NH_3, sp^3, trigonal pyramidal

7. The oxidation number of P in P_4O_6, of S in H_2S and that of Br in BrO_3^- are respectively _____.
    (A) +4, +2 and +5   (B) +5, –2 and +6
    (C) +3, +2 and +5   (D) +3, –2 and +5

8. The energy of a 300 nm photon is _____ J.
    [h = 6.6×10^{-34} J s]
    (A) 6.6×10^{-19} (B) 3.0×10^{-19}
    (C) 6.6×10^{-18} (D) 1.0×10^{-19}

9. Which of the following statements are CORRECT?
    (I)   C = C double bond is shorter than C ≡ C triple bond.
    (II) C – C single bond is longer than C ≡ C triple bond.
    (III) C – N single bond is shorter than C = N triple bond.
    (IV) C – N single bond is longer than C – H bond.
    (A) I , II   (B) II, III
    (C) I, IV   (D) II, IV

10. $MnO_4^- + Br^- \longrightarrow MnO_2 + BrO_3^-$
    In the above reaction, oxidation state of Br changes from _____.
    (A) –1 to +6   (B) 0 to +5
    (C) –1 to +3   (D) –1 to +5

11. The oxidation number of oxygen in sodium peroxide is _____.
    (A) 0   (B) –1
    (C) +1   (D) –2

12. Among the molecules SF_4, ClF_3, BrF_5 and XeF_4 which of the following shapes do NOT describe any of these molecules?
    (A) Trigonal bipyramidal
    (B) See-saw
    (C) T-shape
    (D) Square pyramidal

13. Match the following.

	Compound		Oxidation state of Br
i.	BrF_3	a.	–1
ii.	KBr	b.	+3
iii.	BrO_3^-	c.	+5
iv.	Br_2	d.	0

    (A) i – b, ii – a, iii – c, iv – d
    (B) i – b, ii – c, iii – a, iv – d
    (C) i – c, ii – b, iii – d, iv – a
    (D) i – a, ii – c, iii – d, iv – b

14. Heisenberg's uncertainty principle rules out the exact simultaneous measurement of _____ of a moving microscopic particle.
    (A) probability and intensity
    (B) energy and momentum
    (C) charge density and radius
    (D) position and momentum

15. All statements are CORRECT EXCEPT _____.
    (A) Octet rule is not valid for H-atom and Li-atom.
    (B) Lattice enthalpy of an ionic solid is defined as the energy required to completely separate one mole of solid ionic compound into the gaseous components.
    (C) When a single covalent bond is formed, each combining atom contributes two electrons to the shared pair.
    (D) Elements having low ionization enthalpy can readily form ionic bond with elements having a high negative value of electron gain enthalpy.

16. How many electrons in $_{11}Na$ have n = 2, l = 1?
    (A) 0   (B) 1
    (C) 2   (D) 6

17. Which of the following reaction has the underlined substance being oxidised?
    (A) Zinc oxide + Coke → Zinc + Carbon monoxide
    (B) Iron oxide + Hydrogen → Iron + Water
    (C) Sulphuric acid + Coke → Sulphur dioxide + Carbon dioxide + Water
    (D) Carbon monoxide + Copper oxide → Carbon dioxide + Copper

18. $_8^{16}O$ and $_8^{18}O$ differ from each other in _____.
    (A) their position in the periodic table
    (B) the number of nucleons
    (C) the number of protons
    (D) their chemical properties

19. What is the geometry of $SiCl_4$ molecule?
    (A) T-shape   (B) Tetrahedral
    (C) Bent   (D) Linear

20. The oxidation number of Al in $LiAlH_4$ is _____.
    (A) +3   (B) +4
    (C) +5   (D) +6

21. The element _____ has the simplest emission spectrum.
    (A) oxygen   (B) hydrogen
    (C) carbon   (D) boron

22. Identify the CORRECT statements:
    (I) Carbon tetrachloride is a polar molecule.
    (II) The net dipole moment in carbon tetrachloride is zero.
    (III) The C – Cl bond is polar.
    (IV) In C – Cl bond, carbon is more electronegative than chlorine.
    (A) II, III   (B) II, III, IV
    (C) III, IV   (D) I, III, IV

23. The formula for wavenumber of emission lines in the series of hydrogen spectrum is given as $\bar{v} = R_H \left[\dfrac{1}{n_1^2} - \dfrac{1}{n_2^2} \right]$.
    For Paschen series, n_1 = _____.
    (A) 1   (B) 2   (C) 3   (D) 4

24. **Statement 1:** 3s and 2p orbitals of the same atom can undergo hybridization.
    Statement 2: Orbitals having nearly same energy can undergo hybridization.
    Select the CORRECT option.
    (A) Both statements are TRUE.
    (B) Both statements are FALSE.
    (C) Only statement 1 is TRUE.
    (D) Only statement 2 is TRUE.

25. Oxidation number of 'H' is NOT +1 in:
    (A) CaH_2 (B) H_2S
    (C) H_2O (D) NaOH

26. What is the formal charge on S in $(S = C = N)^-$?
    (A) −1   (B) −2   (C) 0   (D) +2

27. What the oxidation number of 'V' in NH_4VO_2?
    (A) +1   (B) +3   (C) +4   (D) +5

28. Which of the following sets of quantum numbers is NOT permitted?
    (A) n = 2, l = 2, m_l = 0, $m_s = +\dfrac{1}{2}$
    (B) n = 2, l = 0, m_l = 0, $m_s = -\dfrac{1}{2}$
    (C) n = 2, l = 1, m_l = −1, $m_s = -\dfrac{1}{2}$
    (D) n = 2, l = 1, m_l = 0, $m_s = +\dfrac{1}{2}$

29. Two series of spectral lines of atomic hydrogen which do NOT belong to infrared spectral region are _____.
    (A) Lyman and Paschen
    (B) Balmer and Brackett
    (C) Pfund and Lyman
    (D) Lyman and Balmer

30. The CORRECT number of lone pairs on the central atom in SF_4 and BrF_3 molecules, respectively, are _____.
    (A) 1 and 3   (B) 2 and 1
    (C) 2 and 2   (D) 1 and 2

31. **Statement I:** Oxidation involves addition of electronegative element
    Statement II: Reduction involves addition of electropositive element
    In the light of the above statements, choose the CORRECT answer from the options given below:
    (A) Both Statement I and Statement II are true.
    (B) Both Statement I and Statement II are false.
    (C) Statement I is true but Statement II is false.
    (D) Statement I is false but Statement II is true.

Time: 45 min   Total Marks: 50

1. A compound is formed from elements X and Y. The atoms of Y (anions) from ccp lattice. The atoms of X (cations) occupy half of the octahedral voids and half of tetrahedral voids. What is the formula of the compound?
    (A) X_3Y_2 (B) XY (C) X_2Y_3 (D) X_4Y_3

2. Which metal ion plays an important role in in the breakage of glucose and fat molecules, in synthesis of proteins with enzymes, and in regulation of cholesterol level?
    (A) Be^{2+} (B) Mg^{2+}
    (C) Na^+ (D) Li^+

3. Calculate the density of an element having molar mass 56 g mol^{-1} that forms fcc unit cell. $[a^3 \cdot N_A = 32.5 \text{ cm}^3 \text{ mol}^{-1}]$
    (A) 6.9 g cm^{-3} (B) 13.8 g cm^{-3}
    (C) 3.5 g cm^{-3} (D) 9.9 g cm^{-3}

4. The IUPAC name of $CH_3 - CH = CH - CH_2Cl$ is _____.
    (A) 1-chlorobut-2-ene
    (B) 1-chlorobut-3-ene
    (C) 1-chlorobut-2-yne
    (D) 4-chlorobut-2-ene

5. Ethers dissolve in cold concerntrated H_2SO_4 due to formation of oxonium salts. This property distinguishes ethers from _____.
    (A) hydrocarbons   (B) alkyl halides
    (C) alcohols   (D) phenols

6. Identify the INCORRECT statement.
    (A) A galvanic (or voltaic) cell is made of two half cells.
    (B) Salt bridge provides an electrical contact between two solutions by allowing the mixing of the two solutions.
    (C) Two half cells of a galvanic cell are constructed by immersing the two metal plates in solutions of their respective ions placed in separate containers.
    (D) In a galvanic cell, the two half cells are connected by a salt bridge.

7. K_a for CH_3COONH_4 is 1.8×10^{-5} and K_b for NH_4OH is 1.8×10^{-5}. The pH of aqueous solution of CH_3COONH_4 will be _____.
    (A) equal to 1   (B) less than 7
    (C) equal to 7   (D) more than 7

8. $KMnO_4$ oxidises oxalic acid in acidic medium. The number of moles of CO_2 produced per mole of $KMnO_4$ is:
    (A) 1   (B) 2   (C) 5   (D) 10

9. Conversion of ethyl chloride to ethyl alcohol can be done by using _____.
    (A) potassium nitrite (B) alcoholic NH_3
    (C) aqueous KOH   (D) sodium ethoxide

10. Phenol is reduced to cyclohexanol on heating with _____.
    (A) zinc dust   (B) nickel catalyst
    (C) Conc. HNO_3 (D) chromium oxide

11. Sample 'X' has 1.7 g of NH_3. Sample 'Y' has 0.64 g of SO_2. The ratio of the number of moles of NH_3 in sample 'X' to the number of moles of SO_2 in sample 'Y' is _____.
    (A) 10 : 1   (B) 1 : 1
    (C) 1 : 10   (D) 1 : 2

12. Nanoparticles of which of the following will effectively carry out conversion given below:
    But-1-ene $\longrightarrow$ n-Butane
    (A) TiO_2 (B) ZnO
    (C) Pd metal   (D) Gold

13. How many Cl = O are present in perchloric acid?
    (A) 1   (B) 2
    (C) 3   (D) 4

14. Solid CO_2 is an example of _____.
    (A) molecular crystal
    (B) ionic crystal
    (C) covalent network crystal
    (D) metallic crystal

15. The molar conductivity of 0.01 M acetic acid solution at 25 °C is 15.0 Ω^{-1} cm^2 mol^{-1}. What is its conductivity?
    (A) 1.5×10^{-3} Ω^{-1} cm^{-1}
    (B) 1.5×10^{-4} Ω^{-1} cm^{-1}
    (C) 3.0×10^{-4} Ω^{-1} cm^{-1}
    (D) 3.0×10^{-3} Ω^{-1} cm^{-1}

16. A sample of gas initially occupies 35.0 mL at 1.50 atm. What will be the pressure required to reduce its volume to 20.5 mL at constant temperature?
    (A) 1.6 atm   (B) 2.1 atm
    (C) 2.6 atm   (D) 3.5 atm

17. Blue light emitted from a lamp has a wavelength of 460 nm. Find the frequency of this light.
    (A) 6.52×10^{15} s^{-1}
    (B) 3.26×10^{15} s^{-1}
    (C) 3.26×10^{14} s^{-1}
    (D) 6.52×10^{14} s^{-1}

18. What is the EAN of nickel in $Ni(CO)_4$?
    (A) 34
    (B) 35
    (C) 32
    (D) 36

19. In a particular reaction, 2 kJ of heat is released by the system and 6 kJ of work is done on the system. ΔU and ΔH respectively are _____.
    (A) +4 kJ and –2 kJ
    (B) –4 kJ and +2 kJ
    (C) –2 kJ and +4 kJ
    (D) –2 kJ and –4 kJ

20. The stability order of the following alkyl free radicals is _____.

    $\overset{\bullet}{C}H_3$, $\overset{\bullet}{C}(CH_3)_3$, $\overset{\bullet}{C}H(CH_3)_2$, $\overset{\bullet}{C}H_2CH_3$

    (A) $\overset{\bullet}{C}H_3 < \overset{\bullet}{C}(CH_3)_3 < \overset{\bullet}{C}H(CH_3)_2 < \overset{\bullet}{C}H_2CH_3$

    (B) $\overset{\bullet}{C}(CH_3)_3 < \overset{\bullet}{C}H(CH_3)_2 < \overset{\bullet}{C}H_2CH_3 < \overset{\bullet}{C}H_3$

    (C) $\overset{\bullet}{C}H_2CH_3 < \overset{\bullet}{C}H_3 < \overset{\bullet}{C}H(CH_3)_2 < \overset{\bullet}{C}(CH_3)_3$

    (D) $\overset{\bullet}{C}H_3 < \overset{\bullet}{C}H_2CH_3 < \overset{\bullet}{C}H(CH_3)_2 < \overset{\bullet}{C}(CH_3)_3$

21. As per the VSEPR theory, the shape of IF_5 is _____.
    (A) trigonal bipyramidal
    (B) square pyramidal
    (C) square planar
    (D) octahedral

22. The rate $\dfrac{d[B]}{dt}$ for reaction $2A \longrightarrow 3B$ is equal to _____.
    (A) $-\dfrac{3}{2}\dfrac{d[A]}{dt}$
    (B) $-\dfrac{2}{3}\dfrac{d[A]}{dt}$
    (C) $-\dfrac{1}{3}\dfrac{d[A]}{dt}$
    (D) $+\dfrac{3}{2}\dfrac{d[A]}{dt}$

23. Magnetic moment 1.73 BM is given by _____. (Atomic numbers: Ni = 28, Ti = 22, Cr = 24, Co = 27)
    (A) Ni^{2+}
    (B) Ti^{3+}
    (C) Cr^{2+}
    (D) Co^{2+}

24. Which of the following amines on heating with chloroform give foul (offensive) smelling products?
    (A) 1° aliphatic or aromatic amines
    (B) 2° aliphatic or aromatic amines
    (C) 3° aliphatic or aromatic amines
    (D) Only 1° aliphatic amines

25. The IUPAC name of $H_3CCH = CHCH_2OH$ is _____.
    (A) but-2-en-2-ol
    (B) but-1-en-2-ol
    (C) but-1-en-1-ol
    (D) but-2-en-1-ol

26. Product obtained in which of the following reaction will give positive sodium nitroprusside test?
    (A) 3-Methylbut-1-yne $\xrightarrow[1\%HgSO_4]{40\%H_2SO_4}$
    (B) Ethanenitrile $\xrightarrow[H_3O^+]{SnCl_2,HCl}$
    (C) Ethanoyl chloride $\xrightarrow[Pd-BaSO_4]{H_2}$
    (D) Methyl propionate $\xrightarrow[ii) H_3O^+]{i) AlH(i\text{-}Bu)_2}$

27. Identify the INCORRECT statement from following with respect to starch.
    (A) Starch has two components, namely, amylose (15-20%) and amylopectin (80-85%).
    (B) Amylose forms blue coloured complex with iodine.
    (C) Amylopectin is water insoluble component.
    (D) Starch constitutes storage carbohydrate of animals.

28. A 0.1 m solution of K_2SO_4 in water has freezing point of –0.3 °C. What is the value of van't Hoff factor if K_f for water is 1.86 K kg mol^{-1}?
    (A) 1.61
    (B) 16.1
    (C) 0.60
    (D) 1.11

29. Identify the pair of compounds from the following that exhibits functional group isomerism.
    (A) Propan-1-ol and propan-2-ol
    (B) n-Butane and 2-methylpropane
    (C) Ethoxyethane and methoxypropane
    (D) Dimethyl ether and ethanol

30. In an isothermal and reversible process, 64 g of O_2 expands from 10 dm^3 to 100 dm^3 at 300 K. The work done in this process is _____ kJ. [R = Gas constant]
    (A) – 1.8 R
    (B) – 1.4 R
    (C) – 1.1 R
    (D) – 1.6 R

31. Which following statement is INCORRECT about enantiomers?
    (A) Enantiomers are superimposable mirror images.
    (B) Enantiomers have superimposable mirror image relationship.
    (C) Enantiomers have equal and opposite optical rotation.
    (D) Enantiomers differ in their chemical properties.

32. _____ is used in preparation of Bakelite.
    (A) Ethanol
    (B) Diethyl ether
    (C) Dimethyl ether
    (D) Phenol

33. Citric acid is an example of _____ acid.
    (A) aliphatic monocarboxylic
    (B) aromatic dicarboxylic
    (C) aliphatic tricarboxylic
    (D) aromatic monocarboxylic

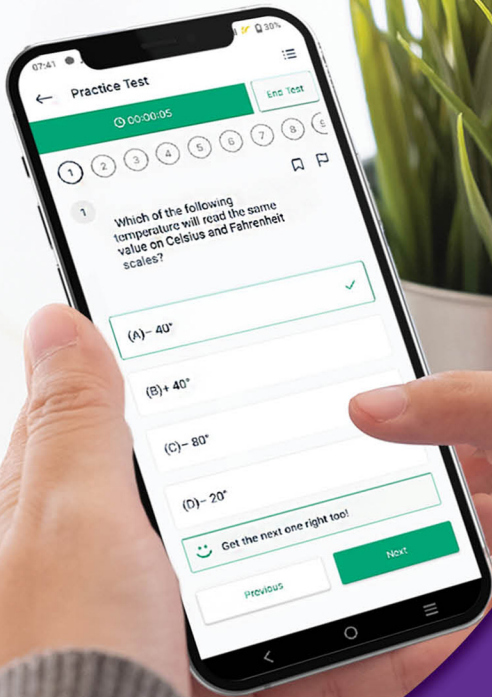Page no. **113** is purposely left blank.

To see complete chapter buy **Target Notes** or **Target E-Notes**

Answers & Solutions

Topic Test - 01

1. (B)

Number of moles of a gas (n)

$= \dfrac{\text{Volume of the gas at STP}}{\text{Molar volume of the gas}}$

i. 1 mol of Ne ≡ 22.4 L of He (molar volume at STP)

2.5 L at STP $= \dfrac{2.5\,\text{L}}{22.4\,\text{L}} = 0.112$ mol of N_2

ii. 89.6 L at STP $= \dfrac{89.6\,\text{L}}{22.4\,\text{L}} = 4$ mol of H_2

iii. 78.4 L at STP $= \dfrac{78.4\,\text{L}}{22.4\,\text{L}} = 3.5$ mol of CO_2

2. (C)

No. of moles of H_2 gas $= \dfrac{20}{2} = 10$ mol

1 mol H_2 gas at STP = 22.4 dm^3

∴ 10 mol H_2 gas at STP = 224 dm^3

3. (A)

Moles of $CH_4 = \dfrac{10^7}{N_A}$ mol

Mass of $CH_4 = \dfrac{10^7}{N_A} \times 16$ g

$= $ Mass of C_2H_6 (given)

∴ Moles of $C_2H_6 = \dfrac{10^7 \times 16}{N_A \times 30}$

(∵ Molar mass of $C_2H_6 = 30$ g mol^{-1})

∴ No. of molecules of $C_2H_6 = \dfrac{10^7 \times 16}{N_A \times 30} \times N_A$

$= 5.33 \times 10^6$

4. (B)

6.022×10^{23} dioxygen molecules are present in 1 mole i.e., 32 g of dioxygen.

∴ 1.8×10^{22} dioxygen molecules will be present in

$\dfrac{1.8 \times 10^{22} \times 32}{6.022 \times 10^{23}} = 0.960$ g of dioxygen.

5. (A)

No. of moles in 10 g $CO_2 = \dfrac{10}{44}$ mol

No. of moles in 10 g $N_2O = \dfrac{10}{44}$ mol

∴ Ratio $= \dfrac{10}{44} \times \dfrac{44}{10} = 1 : 1$

6. (B)

1 mol of Ne ≡ 22.4 L (at STP)

3.0 L of Ne at STP $= \left(\dfrac{1}{22.4} \times 3\right)$ moles.

Number of atoms present in the container

$= \left(6.023 \times 10^{23} \times \dfrac{3}{22.4}\right) = 8.066 \times 10^{22}$

7. (D)

According to law of conservation of mass,

Carbon monoxide + Oxygen ⟶ Carbon dioxide

56 g   +   32 g   = 88 g

8. (D)

6.0×10^{23} Cu atoms = 63.5 g

∴ One million (i.e., 10^6 atoms) $= \dfrac{10^6 \times 63.5}{6.0 \times 10^{23}}$

$= 1.058 \times 10^{-16}$ g

9. (A)

Mass of a carbon atom = 12 u

Mass of a cadmium atom = 112 u

∴ $\dfrac{\text{Mass of a cadium atom}}{\text{Mass of a carbon atom}} = \dfrac{112}{12} = 9.33$

10. (D)

Volume occupied by 1 mole of any gas at STP = 22.4 L

2 moles of N_2 will occupy 44.8 L of volume at STP.

2.5 moles of CO_2 will occupy 56 L of volume at STP.

11. (D)

12. (C)

In MKS system, the unit for time is second.

13. (C)

Formula mass of KBr

= Atomic mass of K + Atomic mass of Br

= 39.1 u + 79.9 u = 119.0 u

14. (B)

Potassium ferrocyanide = $K_4[Fe(CN)_6]$

1 mole $K_4[Fe(CN)_6]$ = 6 mol of carbon

∴ 0.5 mol $K_4[Fe(CN)_6]$ = 3 mol carbon

$= 3 \times 12$ g carbon

$= 36$ g carbon

15. (B)

Molar mass of He = 4 g mol^{-1};

Amount of He = 10.0 g

∴ Number of moles of He $= \dfrac{10.0}{4} = 2.5$ mol

1 mol of He = 6.022×10^{23} atoms

∴ 2.5 mol of He $= \dfrac{2.5 \times 6.022 \times 10^{23}}{1}$

$= 1.5055 \times 10^{24}$ atoms

$\approx 1.5 \times 10^{24}$ atoms

16. (A)

17. (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.