T

COMMON HALF YEARLY EXAMINATION - 2024

Standard - XI Reg No

CHEMISTRY

Time: 3.00 hrs. **Marks: 70**

PART - I

I) **Answer all the questions.**

II) **Choose the most appropriate answer from the given four alternatives and write the option code and corresponding answer.** 15×1=15

1. The general formula for cycloalkanes
   a) C_nH_n b) C_nH_{2n} c) C_nH_{2n-2} d) C_nH_{2n+2}

2. Match the compounds given in column I with suitable use given in column II

Column I (compound)	Column (uses)
A) Iodoform	1. Fire extinguisher
B) Carbon tetra chloride	2. Insecticide
C) CFC	3. Antiseptic
D) DDT	4. Refrigerants

   a) A → 2 ; B → 4 ; C → 1 ; D → 3 b) A → 3 ; B → 2 ; C → 4 ; D → 1
   c) A → 1 ; B → 2 ; C → 3 ; D → 4 d) A → 3 ; B → 1 ; C → 4 ; D → 2

3. The IUPAC name of $CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH = C(CH_3)_2$ is
   a) 2, 4, 4 - Trimethylpent - 2 - ene b) 2, 4, 4 - Trimethylpent - 3 - ene
   c) 2, 2, 4 - Trimethylpent - 3 - ene d) 2, 2, 4 - Trimethylpent - 2 - ene

4. Use of glycol as an antifreezer in an automobile is an important application of _____.
   a) Colligative property b) Raoult's law
   c) Fractional crystallisation d) Hydrolysis

5. $\frac{K_C}{K_p}$ for the reaction, $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ is
   a) $\frac{1}{RT}$ b) $\sqrt{RT}$ c) RT d) $(RT)^2$

6. Bhopal Gas Tragedy is a case of _____.
   a) thermal pollution b) air pollution c) nuclear pollution d) land pollution

7. Shape and hybridisation of IF_5 are
   a) Trigonal bipyramidal, sp^3d^2 b) Trigonal bipyramidal, sp^3d
   c) Square pyramidal, sp^3d^2 d) Octahedral, sp^3d^2

8. *Assertion :* $BeSO_4$ is soluble in water while $BaSO_4$ is not.
   Reason : Hydration energy decreases down the group from Be to Ba and the lattice energy remains almost constant.
   a) both assertion and reason are true and reason is the correct explanation of assertion.
   b) both assertion and reason are true and reason is not the correct explanation of assertion.
   c) assertion is true but reason is false d) both assertion and reason are false

9. The value of ΔH for cooling 2 moles of an ideal monoatomic gas from 125° to 25°c at constant pressure will be [given : $C_P = \frac{5}{2}R$]

a) -250R b) -500R c) 500R d) +250R

10. Tritium is a _____ emitter.

a) α b) β c) γ d) None of these

11. The critical temperature of CO_2 is

a) 31.1°c b) 30.1°c c) 21.1°c d) 35.5°c

12. The energy of an electron in the 3rd orbit of hydrogen atom is –E. The energy of an electron in the first orbit will be

a) -3E b) $\frac{-E}{3}$ c) $\frac{-E}{9}$ d) -9E

13. The equivalent mass of Ferrous oxalate is

a) $\frac{\text{molar mass of Ferrous oxalate}}{1}$ b) $\frac{\text{molar mass of Ferrous oxalate}}{2}$

c) $\frac{\text{molar mass of Ferrous oxalate}}{3}$ d) none of these

14. The element with positive electron gain enthalpy is

a) Hydrogen b) Sodium c) Argon d) Fluorine

15. Which of the following species does not acts as a nucleophile?

a) ROH b) ROR c) PCl_3 d) BF_3

PART - II

Note : Answer any six questions. Q.no.24 is compulsory: **6×2=12**

16. Define equivalent mass.
17. Explain the exchange reactions of deuterium.
18. Give Kelvin - Planck statement of Second Law of Thermodynamics.
19. Write balanced chemical equation for the following processes.
    a) evaporating a solution of Calcium hydrogen Carbonate.
    b) heating Calcium Oxide with Carbon.
20. Explain the effect of pressure on the solubility.
21. Applying VSEPR theory, Predict the shapes of IF_7 and SF_6.
22. How is DDT prepared?
23. What happens when ethylene is passed through cold dilute Alkaline Potassium Permanganate?
24. What is the debroglie wavelength (in cm) of a 160g Cricket ball travelling at 140 Km/hr?

PART - III

Note : Answer any six questions. Q.No.33 is compulsory. **6×3=18**

25. Give any three rules for assigning the oxidation number.

26. Briefly give the basis for pauling's scale of electronegativity.
27. Explain Castner - Kellner process.
28. State Law of mass action.
29. What are the limitations of Henry's law?
30. Give the general characteristics of Organic compounds.
31. Explain inductive effect with suitable example.
32. Differentiate BOD and COD.
33. A hydrocarbon C_3H_6(A) reacts with HBr to form compound (B). Compound (B) reacts with aqueous Potassium hydroxide to give (C) of molecular formula C_3H_8O. What are (A), (B) and (C). Explain the reactions.

PART - IV

Note : Answer all the questions: 5x5=25

34. A) i) Explain briefly the time independent Schrodinger wave equation? (3)
    ii) State Pauli's exclusion principle. (2) (OR)
    B) iii) Calculate the empirical formula of a compound containing 76.6% carbon, 6.38% hydrogen and rest oxygen. (3)
    iv) Define electronegativity. (2)
35. A) i) Compare the structure of H_2O and H_2O_2. (3)
    ii) What is retrograde solubility. (2) (OR)
    B) iii) State Graham's law of diffusion. (2)
    iv) What are state functions and path functions? Give two examples.
36. A) i) Derive a general expression for the equilibrium constant K_p and K_C for the reaction. (5)
    $3H_2(g) + N_2(g) \rightleftharpoons 2NH_3(g)$ (OR)
    B) ii) Using MO theory of Co molecule, predict the following.
    a) Bond order (1)
    b) Magnetic nature (1)
    c) MO diagram (1)
    iii) Draw the Lewis structures of the following :
    1) NO_3^- 2. SO_4^{2-}
37. A) i) Explain Cis - trans isomerism. (2)
    ii) Obtain an expression for lowering of vapour pressure when non-volatile solute is dissolved in solvent. (3) (OR)
    B) i) Describe the conformers of n-butane. (3)
    ii) Write short note on Resonance. (2)
38. A) i) Explain the mechanism of S_N^1 reaction by highlighting the stereochemistry behind it. (3)
    ii) What is meant by Eutrophication? (2) (OR)
    B) Starting from CH_3MgI, How will you prepare the following?
    1. Acetic acid (1½)
    2. Acetone (1½)
    3. Ethyl acetate (2)