COMMON HALF YEARLY EXAMINATION - 2024

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Standard XI

Reg.No. [ ][ ][ ][ ][ ][ ]

CHEMISTRY

Time : 3.00 hrs *Marks : 70*

Part - A

I. Choose the correct answer: 15 x 1 = 15

1. 7.5 g of a gas occupies a volume of 5.6 litres at 0°C and 1 atm pressure. The gas is
   a) No b) N_2O c) CO d) CO_2
2. Splitting of spectral lines in an electric field is called
   a) Zeeman effect b) Shielding effect c) Stark effect d) Compton effect
3. Formula of Gypsum is
   a) $CaSO_4$ b) $CaSO_4.2H_2O$ c) $CaSO_4.{}^1/_2H_2O$ d) $CaSO_4.H_2O$
4. Which of the following elements will have the highest electronegativity?
   a) Chlorine b) Nitrogen c) Cesium d) Fluorine
5. The Hybridisation of oxygen atom is H_2O and H_2O_2 are respectively
   a) sp and sp^3 b) sp and sp c) sp and sp^2 d) sp^3 and sp^3
6. Maximum deviation from ideal gas expected from
   a) $CH_{4(g)}$ b) $NH_{3(g)}$ c) $H_{2(g)}$ d) $N_{2(g)}$
7. Which one of the following is extensive property?
   a) Molar volume b) Molality c) Gibbs free energy d) Free energy change
8. Kc/Kp for the reaction, $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ is
   a) $1/RT$ b) $\sqrt{RT}$ c) RT d) $(RT)^2$
9. Osmotic pressure (π) of solution is given by the relation
   a) $\pi = nRT$ b) $\pi V = nRT$ c) $\pi RT = n$ d) none of these
10. Which one of the following is diamagnetic?
    a) O_2^{2-} b) O_2^+ c) O_2 d) none of these
11. The IUPAC name of the compound $CH_3 - CH_2 - CH(OH) - CHO$
    a) 1-Formyl Propanol b) 1-Hydroxy butanal
    c) 2-Hydroxy butanal d) 3-Hydroxy butanal
12. Which of the following is aliphatic saturated hydrocarbon?
    a) C_8H_{18} b) C_9H_{18} c) C_8H_{14} d) All of these
13. The name of $C_2F_4Cl_2$ is _____.
    a) Freon-112 b) Freon-113 c) Freon-114 d) Freon-115
14. The Geometrical shape of carbocation is
    a) Linear b) Tetrahedral c) Planar d) Pyramidal
15. The pH of normal rain water is
    a) 6.5 b) 7.5 c) 5.6 d) 4.6

Part - B

II. Answer any 6 questions. (Q.No.24 is compulsory) 6 x 2 = 12

16. What do you understand by the term Mole?
17. State Heisenberg's uncertainty principle.
18. Write the uses of Hydrogen?
19. What is State function? Give two examples.
20. Explain Homogeneous equilibrium and Heterogeneous equilibrium. Give an example.
21. State Raoult's law?

22. Draw Cis, Trans isomers for 2,3 dichloro-2-butene
23. What is Williamson's ether synthesis?
24. $C_{(g)} + O_{2(g)} \longrightarrow CO_{2(g)}$, Calculate standard entropy change for the above reaction, given that the standard entropies of $CO_{2(g)}$, $C_{(s)}$, $O_{2(g)}$ are 213.6, 5.740 and 205 JK^{-1} respectively.

Part - C

III. Answer any 6 questions. (Q.No.28 is compulsory) 6 x 3 = 18

25. Calculate the oxidation number of underlined elements: i) $\underline{C}O_2$ ii) $H_2\underline{S}O_4$ iii) $K\underline{Mn}O_4$
26. Explain the fact that the second ionisation potential is always higher than first ionisation potential.
27. Write the Vander Waals equation for real gas. Explain the correction term for pressure and volume.
28. Write Kp, Kc and Δng
    i) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$ ii) $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$
29. Mention the shape of following molecule base on VSEPR Theory?
    i) BF_3 ii) BrF_3 iii) PCl_5
30. Differentiate BOD and COD.
31. Write the formula to calculate the molar mass of a solute from relative lowering of vapour pressure values.
32. Explain Markovnikoff's rule with suitable example.
33. Give the IUPAC name of the following compounds.
    i) $CH_2 = CH - CH = CH_2$ ii) $CH_3 - CH_2 - CH_2 - O - CH_3$
    iii) $CH_3 - \underset{\displaystyle OH}{\underset{|}{CH}} - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 = COOH$

Part - D

IV. Answer all the questions. 5 x 5 = 25

34. a) i) Calculate the Empirical and Molecular formula of a compound containing 76.6% carbon, 6.38% hydrogen and rest oxygen.
    ii) Define Equivalent mass. ***(OR)***
    b) i) Derive de-Broglie equation.
    ii) What are the isoelectronic ions? Give example.
35. a) Discuss the similarities between beryllium and aluminium. ***(OR)***
    b) i) How is tritium prepared? ii) List the characteristics of internal energy.
36. a) i) Derive the Kp and Kc for the following equilibrium equation.
    $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$
    ii) Write down the limitations of Henry's law. ***(OR)***
    b) i) Derive the ideal gas equation. ii) Distinguish between diffusion and effusion
37. a) i) Define Isotonic solutions?
    ii) Discuss the formation of O_2 molecule using MOT. (Molecular Orbital Theory)
    (OR)
    b) i) Give the general characteristics of organic compounds.
    ii) What are electrophiles and nucleophiles? Give examples.
38. a) i) Define Huckel's rule. ii) Explain cyclic polymerisation. ***(OR)***
    b) Explain the preparation of the following compounds :
    i) DDT ii) Chloropicrin iii) Biphenyl

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