HALF YEARLY EXAMINATION -2024

CHEMISTRY

Class : 11 Reg No. _____

Time : 3.00 HRS MARKS: 70

PART - I 15x1=15

I Choose the correct answer.

1. Which of the following is used as a standard for atomic mass?
   a) $_6C^{12}$ b) $_7C^{12}$ c) $_6C^{13}$ d) $_6C^{14}$
2. For d-electron, the orbital angular momentum is
   a) $\frac{\sqrt{2}\,h}{2\pi}$ b) $\frac{\sqrt{2h}}{2\pi}$ c) $\frac{\sqrt{2x4}\,h}{2\pi}$ d) $\frac{\sqrt{6}\,h}{2\pi}$
3. Which of the following elements will have the highest electronegativity?
   a) Chlorine b) Nitrogen c) Cesium d) Fluorine
4. Intra molecular Hydrogen bonidng is present in
   a) Ortho - nitrophenol b) Ice c) Water d) Hydrogen fluoride
5. Sodium is stored in
   a) Alcohol b) Water c) Kerosene d) none of these
6. Maximum deviation from ideal gas is expected from
   a) $CH_{4(g)}$ b) $NH_{3(g)}$ c) $H_{2(g)}$ d) $N_{2(g)}$
7. Change internal energy, when 4 KJ of work is done on the system and 1 KJ of heat is given out by the system is
   a) +1 KJ b) -5KJ c) +3KJ d) -3KJ
8. In a chemical equilibrium, the rate constant for the forward reaction is 2.5×10^2 and the equilibrium constant is 50. The rate constant for the reverse reaction is
   a) 11.5 b) 5 c) $2x10^2$ d) $2x10^3$
9. What is molality of a 10% w/w aqueous soidum hydroxide solution?
   a) 2.778 b) 2.5 c) 10 d) 0.4
10. In the molecule $O_A=C=O_B$, the formal charge on O_A, C and O_B are respectively,
    a) -1,0,+1 b) +1,0,-1 c) -2,0,+2 d) 0,0,0
11. The purity of an organic compound is determined by
    a) Chromatography b) Crystalisation c) melting or boiling point d) both (a) and (c)
12. The geometrical shape of carbocation is
    a) Linear b) Tetrahedral c) Planar d) Pyramidal
13. Which of the following compounds will not undergo Friedal-crafts reaction easily
    a) Nitro benzene b) Toluene c) Cumene d) Xylene
14. Assertion : Increasing order of boiling points of halo alkanes are $CH_3Cl<CH_2Cl_2<CHCl_3<CCl_4$
    Reason : The boiling point of halo alkanes increase with increase in the number of halogen atoms.
    a) Assertion is true but reason is false.
    b) Both assertion and reason are true and reason is the correct explanation of assertion.
    c) Both assertion and reason are false.
    d) Both assertion and reason are true and reason is not the correct explanation of assertion.
15. Match the List I with List II and select the correct answer using the code given below the lists.

List - I	List - II
A. Depletion of ozone layer -	1. CO_2
B. Acid rain -	2. NO
C. Photo chemical smog -	3. SO_2
D. Green house effect -	4. CFC

Code

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

PART - II

6x2=12

II **Answer any 6 questions (Q.No:24 is compulsory).**

16. Distinguish between Oxidation and Reduction.
17. How many orbitals are possible for n = 4?
18. Give the uses of heavy water.
19. Which is known as "desert rose"?
20. Define reaction Quotient.
21. What are the conditions when a solution tends to be behave like an ideal solution?
22. Write β-elemination reaction.
23. Prove cyclo propenyl cation is aromatic.
24. Complete the following reactions.

(i) $CH_3 - CH = CH_2 + HBr \longrightarrow$ (ii) $C_6H_6 + Cl_2 \xrightarrow{UV}$

PART - III

6x3=18

III **Answer any 6 questions (Q.No:33 is compulsory).**

25. Write the limitations of Bohr's atom model.
26. How do you convert para hydrogen into ortho hydrogen?
27. Distinguish between diffusion and effusion.
28. What are State and Path functions? Give two examples.
29. What is σ bond and π bond? Which is more stable?
30. Explain geometrical isomerism in 2 - butene.
31. What are Freons? Write their uses.
32. Differentiate :- BOD and COD.
33. An organic compound (A) of molecular formula C_2H_6O, on heating with conc.H_2SO_4 gives compound (B). (B) on treating with cold dilute alkaline $KMnO_4$ gives compound(C). Identify (A), (B) and (C).

PART - IV

IV **Answer all the questions.** 5x5=25

34. a) (i) Explain briefly the time independent schrodinger wave equation? (3)
(ii) Write the electronic configuration of Mn^{2+} and Cr^{3+} **(OR)** (2)
b) Calculate the empirical and molecular formula of a Compound containing 76.6% carbon, 6.38% hydrogen and rest oxygen. Its vapour density is 47. (5)

35. a) (i) Write down the Born - Haber cycle for the fomation $CaCl_2$. (3)
(ii) State the third law of themodynamics. **(OR)** (2)
b) Derive the value of critical constants in terms of Vander Waals Constants? (5)

36. a) Draw the M.O diagram for oxygen molecule. Calculate its bond order and show that O_2 is paramagnetic. **(OR)** (5)
b) (i) Derive the relation between Kp and Kc. (3)
(ii) State Le-Chatlier principle. (2)

37. a) Derive the structure of Benzene.**(OR)** (5)
b) (i) What are electrophiles and nucleophiles? Give suitable examples for each. (3)
(ii) Define Retention factor (Rf). (2)

38. a) (i)Give the IUPAC names of the following compounds. (2)

(i) $CH_3-CH_2-\underset{OH}{CH}-CHO$ (ii) $CH_3-C\equiv C-\underset{Cl}{CH}-CH_3$

(ii) Explain the importance of green chemistry in day-to-day life. **(OR)** (3)
b) (i)Explain the preparation of the following compounds. (3)
(i) DDT (ii) Biphenyl (iii) Chloropicrin
(ii) What is Eutrophication? (2)