HSS
11 - Std
Time : 3.00 Hrs

HALF YEARLY EXAMINATION - 2024
CHEMISTRY

Marks : 70

PART – I

I **Answer all the questions.** 15 X 1 = 15

1. Which of the following is / are true with respect to Carbon – 12
a) relative atomic mass is 12u b) oxidation number of Carbon is +4 in all its compounds c) mole of Carbon – 12 contain $6.022X10^{22}$ carbon atoms d) all of these

2. How many electrons in an atom with atomic number 105 can have $(n + l) = 8$
a) 30 b) 17 c) 15 d) unpredictable

3. Among the following which is isoelectronic with O^{2-} ion,
a) Cl^- b) F^- c) Ca^{2+} d) N^{2-}

4. The cause of permanent hardness of water is due to
a) $Ca(HCO_3)_2$ b) $Mg(HCO_3)_2$ c) $CaCl_2$ d) $MgCO_3$

5. Sodium is stored in
a) Alcohol b) Water c) Kerosene d) None of these

6. It temperature and volume of an ideal gas is increased to twice its values, the initial pressure P becomes a) 4p b) 2p c) p d) 3p

7. Heat of combustion is always
a) Positive b) negative c) zero d) either positive or negative

8. In the reaction, $Fe(OH)_{3(s)} \rightleftharpoons Fe^{3+}(aq) + 3OH^-(ag)$ if the concentration of OH^- ions is decreased by $^1/_4$ times, then the equilibrium concentration of Fe^{3+} will
a) not changed b) also decreased by $^1/_4$ times
c) increase by 4 times d) increase by 64 times

9. According to Raoults law, the relative lowering of vapour pressure for a solution is equal to a) mole fraction of solvent b) mole fraction of solute
c) number of moles of solute d) number of moles of solvent

10. Number of sigma (σ) and pi (π) bonds in acetylene is ..... .
a) 2σ & 2π b) 3σ & 3π c) 2σ & 3π d) 3σ & 2π

11. Sodium nitropruside reacts with sulphide ion to give a purple colour due to the formation of
a) $[Fe(CN)_5 NO]^{3-}$ b) $[Fe(NO)_5 CN]^+$ c) $[Fe(CN)_5 NOS]^{4-}$ d) $[Fe(CN)_5 NOS]^{3-}$

12. What is the hybridisation state of benzyl carbonium ion?
a) sp^2 b) spd^2 c) sp^3 d) sp^2d

13. ..... is used for welding and cutting metals.
a) Ethylene b) Propylene c) Poly ethylene d) Oxy - acetylene

14. What should be the correct IUPAC name of diethyl chloromethane?
a) 3 - chloro pentane b) 1 - chloropentane
c) 1 - chloro - 1, 1, diethyl methane d) 1 - chloro - 1 - ethylepropane

15. The pH of normal rain water is ..... .
a) 6.5 b) 7.5 c) 5.6 d) 4.6

PART - II

II **Answer any six. (q.No. 24 is compulsory).** 6 x 2 = 12

16. Define modern periodic law.

17. What is water - gas shift reaction?

18. Distinguish between diffusion and effusion.
19. What is the usual definition of entropy? What is the unit of entropy?
20. Define Octet rule.
21. What is asymmetric carbon?
22. Write about Dow's process.
23. Define smog.
24. Give the electronic configuration of Mn^{2+} and Cr^{3+}.

PART - III

III Answer any six from the following. (Q.No. 33 is compulsory). 6 x 3 = 18

25. Define equivalent mass.
26. Electron affinity of fluorine is less then that of chlorine. Why?
27. Give any three uses of gypsum.
28. Write the Dalton's law of partial prassure.
29. Define (i) Molality (ii) Normality
30. Explain β - elimination reaction with example.
31. Explain Kolbe's electrolytic method.
32. What is green chemistry?
33. Explain how will you predict the direction of a equilibrium reaction.

PART -IV

IV Answer all the question. 5 x 5 = 25

34. a) i) Calculate the oxidation number for the following underlined elements.
(i) $\underline{S}O_2$ (ii) $\underline{Cr}_2O_7^{2-}$
ii) What is screening effect? ***(OR)***
b) Write the postulates of Bohr atom model.

35. a) i) Give the three types of covalent hydrides:
ii) Why alkaline earth metals are harder than alkali metals? ***(OR)***
b) List the characteristics of Gibbs free energy.

36. a) Derive a general expression for the equilibrium constant Kp and Kc for the reaction.
$3H_{2(g)} + N_{2(g)} \rightleftharpoons 2NH_{3(g)}$. ***(OR)***
b) Draw the M.O. diagram for oxygen molecule. Calculate its bond order and show that O_2 is paramagnetic.

37. a) i) Explain the effect of pressure on the solubility.
ii) What is inversion temperature. (T_i)? ***(OR)***
b) Briefly explain geometrical isomerism in alkene by considering 2 - butene as an example.

38. a) (i) Complete the following. (i) 2 - butyne $\xrightarrow[Catalyst]{Lindlar}$? (ii) $CaC_2 \xrightarrow{H_2O}$?.
(ii) Write about Swart's reaction. ***(OR)***
b) How is acid rain formed? Explain the effect.