

# QUARTERLY EXAMINATION – 2024

## CHEMISTRY

**11-STD**

Time : 3 hours

Maximum Marks = 70

**SECTION – I**

Note: 1) Answer all the questions. 2) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer. 15 X 1 = 15

- Which one of the following is used as a standard for atomic mass.  
a)  ${}_6\text{C}^{12}$       b)  ${}_7\text{C}^{12}$       c)  ${}_6\text{C}^{13}$       d)  ${}_6\text{C}^{14}$
- Splitting of spectral lines in an electric field is called  
a) Zeeman effect    b) Shielding effect    c) Compton effect    d) Stark effect
- Electronic configuration of species  $M^{2+}$  is  $1s^2 2s^2 2p^6 3s^2 3p^4 3d^0$ , its atomic weight is 56. The number of neutrons in the species, M is  
a) 26      b) 22      c) 30      d) 24
- What would be the IUPAC name for an element with atomic number 106  
a) unnilseptium    b) unnilhexium    c) ununhexium    d) ununseptium
- In a given shell the order of screening effect is  
a)  $s > p > d > f$     b)  $s > p > f > d$     c)  $f > d > p > s$     d)  $f > p > s > d$
- The cause of permanent hardness of water is due to  
a)  $\text{Ca}(\text{HCO}_3)_2$     b)  $\text{Mg}(\text{HCO}_3)_2$     c)  $\text{CaCl}_2$       d)  $\text{MgCO}_3$
- Match the equilibria with the corresponding conditions

Equilibria	Condition
i) Liquid $\rightleftharpoons$ Vapour	1) melting point
ii) Solid $\rightleftharpoons$ Liquid	2) saturated solution
iii) Solid $\rightleftharpoons$ Vapour	3) Boiling point
iv) Solute(s) $\rightleftharpoons$ Solute(solution)	4) Sublimation point

	i)	ii)	iii)	iv)
a)	1	2	3	4
b)	3	1	4	2
c)	2	1	3	4
d)	3	2	4	1

- First law of thermodynamics  
a)  $H = U + PV$     b)  $H = U + nRT$     c)  $\Delta U = q + w$     d)  $\Delta U = C_v (T_2 - T_1)$
- The half life period of Tritium is  
a) 60 years      b) 12.3 years      c) 1230 years      d) 15.3 years
- The bond dissociation energy of methane and ethane are  $360 \text{ KJmol}^{-1}$  and  $620 \text{ KJmol}^{-1}$  respectively. Then the bond dissociation energy of C – C bond is  
a)  $170 \text{ KJmol}^{-1}$     b)  $50 \text{ KJmol}^{-1}$     c)  $80 \text{ KJmol}^{-1}$     d)  $220 \text{ KJmol}^{-1}$
- The catalyst used in contact process of large scale preparation of  $\text{SO}_3$  is  
a)  $\text{SO}_2$       b)  $\text{V}_2\text{O}_5$       c) Fe      d)  $\text{MnO}_2$
- Assertion :  $\text{CH}_3-\text{C}=\text{CH}-\text{COOH}$  is 3-carboxy-2-butenic acid  
Reason : The principal functional group gets lowest number followed by double bond (or) triple bond.  
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.
- Rate of diffusion of gas is  
a) directly proportional to its density    b) directly proportional to its molecular weight  
c) directly proportional to the square root of its molecular weight  
d) inversely proportional to the square root of its molecular weight
- I effect is shown by    a) – Cl      b) – Br      c) both a) and b)    d)  $-\text{CH}_3$
- The geometrical shape of carbocation is  
a) Linear      b) Tetrahedral    c) planar      d) pyramidal

**SECTION – II**

Answer any six questions and question number 24 is compulsory.

6 X 2 = 12

- What do you understand by the term Limiting reagent?

17. Electronegativity of noble gases is positive. Why?
18. Compare the structures of  $H_2O$  and  $H_2O_2$ .
19. Can Van der Waals gas with  $a = 0$  be liquefied? Explain.
20. State Hess's law of constant heat of summation.
21. Give any two general characteristics of organic compounds.
22. Explain inductive effect.
23. Give two examples for positive mesomeric effect. (+M)
24. The equilibrium concentrations of  $NH_3$ ,  $N_2$  and  $H_2$  are  $1.8 \times 10^{-2} M$ ,  $1.2 \times 10^{-2} M$  and  $3 \times 10^{-2} M$  respectively. Calculate the equilibrium constant for the formation of  $NH_3$  from  $N_2$  and  $H_2$ . ( $M = \text{mol lit}^{-1}$ )

## SECTION – III

Answer any six questions and question number 33 is compulsory.

6 x 3 = 18

25. Calculate the molar mass of the following compounds i) acetone ( $CH_3COCH_3$ )  
ii) Sulphuric acid ( $H_2SO_4$ )
26. Explain briefly i) Principal quantum number and ii) Azimuthal quantum number.
27. Explain the exchange reactions of deuterium.
28. Explain the following observation. i) aerated water bottles are kept under water during summer.  
ii) Astronauts have to wear protective suits when they are on the surface of moon
29. List the characteristics of Internal energy.
30. Derive the  $K_p$  and  $K_c$  for the formation of  $HI_{(g)}$  from  $H_{2(g)}$  and  $I_{2(g)}$ .
31. Give the principles involved in the estimation of halogen in an organic compound by Carius method.
32. Give examples for the following types of organic reactions.  
i)  $\beta$  – elimination ii) Electrophilic substitution.
33. 0.30 g of a organic substance gives 0.88g of  $CO_2$  and 0.54 g of water. Calculate the % of carbon and Hydrogen in it.

## SECTION – D

Answer all the questions.

5 x 5 = 25

34. A. i) Define the term mole.  
ii) Balance the following equation by oxidation number method.  
 $KMnO_4 + Na_2SO_3 \rightarrow MnO_2 + Na_2SO_4 + KOH$   
(OR)
- B. i) Define Orbital ii) Explain the postulates of Bohr's atomic model.
35. A. i) Write the general electronic configuration of lanthanoids and actinoids.  
ii) Explain the Pauling method for the determination of ionic radius.  
(OR)
- B. i) What is water gas shift reaction?  
ii) How do you convert para hydrogen into ortho hydrogen.
36. A. i) What is Joule – Thomson effect?  
ii) Explain 3 methods used for liquefaction of gases.  
(OR)
- B. i) An engine operating between  $127^\circ C$  and  $47^\circ C$  takes same amount of heat from high temperature reservoir. Calculate the % efficiency of an engine.  
ii) What are state and path functions? Give two examples for each.
37. A. i) State Lechatelier Principle  
ii) Explain how will you predict the direction of a equilibrium reaction.  
(OR)
- B. i) Write the balanced chemical equation for a equilibrium reaction for which the equilibrium constant is given by the expression  $K_c = \frac{[NH_3]^4 [O_2]^6}{[NO]^4 [H_2O]^6}$   
ii) What are the applications of equilibrium constant?
38. A. i) What are called as enantiomers?  
ii) Explain any 3 structural isomers with example.  
(OR)
- B. i) Give any two differences between nucleophile and electrophile.  
ii) Write a note on – No bond resonance.

FTM-11-CHEM-I