

# QUARTERLY EXAMINATION - 2022

## CHEMISTRY

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11 - STD

Time : 3 hours

Marks : 70

## PART - I

Choose the correct answer and write down with option.

[15 x 1 = 15]

1. Carbon forms two oxides, namely carbon monoxide and carbon dioxide. The equivalent mass of which element remains constant?  
 (a) Carbon (b) oxygen (c) both carbon and oxygen (d) neither carbon nor oxygen
2. Which of the following contain same number of carbon atoms as in 6 g of carbon-12.  
 (a) 7.5 g ethane (b) 8 g methane (c) both (a) and (b) (d) none of these
3. If  $n = 6$ , the correct sequence for filling of electrons will be,  
 a)  $ns^2 (n-2)f^6 (n-1)d^1 np^1$  b)  $ns^2 (n-1)d^1 (n-2)f^6 np^1$   
 c)  $ns^2 (n-2)f^6 np^1 (n-1)d^1$  d) none of these are correct
4. What would be the IUPAC name for an element with atomic number 222?  
 a) bibibium (b) bididium (c) didibium (d) bibibium
5. **Assertion** : Permanent hardness of water is removed by treatment with washing soda.  
**Reason** : Washing soda reacts with soluble calcium and magnesium chlorides and sulphates in hard water to form insoluble carbonates  
 a) Both assertion and reason are true and reason is the correct explanation of assertion.  
 b) Both assertion and reason are true but reason is not the correct explanation of assertion.  
 c) Assertion is true but reason is false d) Both assertion and reason are false
6. The hybridisation of oxygen atom in  $H_2O$  and  $H_2O_2$  are, respectively  
 a)  $sp$  and  $sp^3$  (b)  $sp$  and  $sp^2$  (c)  $sp$  and  $sp^2$  (d)  $sp^3$  and  $sp^3$
7. The units of Vander Waals constants 'b' and 'a' respectively  
 a)  $mol L^{-1}$  and  $L atm^2 mol^{-1}$  (b)  $mol L$  and  $L atm \cdot mol^2$  (c)  $mol^{-1}L$  and  $L^2 atm mol^{-2}$  (d) none of these
8. Equal moles of hydrogen and oxygen gases are placed in a container, with a pin-hole through which both can escape what fraction of oxygen escapes in the time required for one-half of the hydrogen to escape.  
 a)  $3/8$  (b)  $1/2$  (c)  $1/8$  (d)  $1/4$
9. All the naturally occurring processes proceed spontaneously in a direction which leads to  
 a) decrease in entropy (b) increase in enthalpy  
 c) increase in free energy (d) decrease in free energy
10. Which of the following is not a thermodynamic function ?  
 a) internal energy (b) enthalpy (c) entropy (d) frictional energy
11. Consider the following reversible reaction at equilibrium,  $A + B \rightleftharpoons C$ , If the concentration of the reactants A and B are doubled, then the equilibrium constant will  
 a) be doubled (b) become one fourth (c) be halved (d) remain the same
12. Which one of the following is incorrect statement ?  
 a) for a system at equilibrium,  $Q$  is always less than the equilibrium constant  
 b) equilibrium can be attained from either side of the reaction  
 c) presence of catalyst affects both the forward reaction and reverse reaction to the same extent  
 d) Equilibrium constant varied with temperature
13. Select the molecule which has only one  $\delta$  bond.



14. a)  $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$  b)  $\text{CH}_3-\text{CH}=\text{CH}-\text{CHO}$  c)  $\text{CH}_3-\text{CH}=\text{CH}-\text{COOH}$  d) All of these  
 $\text{CH}_2-\overset{\ominus}{\underset{\text{O}}{\parallel}}{\text{C}}-\text{CH}_3$  and  $\text{CH}_2=\overset{\ominus}{\underset{\text{O}}{\text{C}}}-\text{CH}_3$  are
15. Heterolytic fission of C-C bond results in the formation of
- a) resonating structure b) tautomers c) Optical isomers d) Conformers.  
 (a) free radical (b) Carbanion  
 (c) Carbocation (d) Carbanion and Carbocation

**PART - II****ANSWER ANY SIX OF THE FOLLOWING. Q.NO 21 IS COMPULSORY.**

[6 x 2 = 12]

16. What do you understand by the term mole?  
 17. How many radial nodes for 2s, 4p, 5d and 4f orbitals exhibit? How many angular nodes?  
 18. Define modern periodic law.  
 19. State Gay-Lussac's law.  
 20. Explain intensive properties with two examples  
 21. State Le-Chatelier principle.  
 22. Give the functional group for i) alcohols and ii) carboxylic acids.  
 23. Write briefly about inductive effect?  
 24. What is hyperconjugation?

**PART - III****ANSWER ANY SIX OF THE FOLLOWING. Q.NO 33 IS COMPULSORY.**

[6 x 3 = 18]

25. Calculate the oxidation number of the underlined elements in the following species.  
 a)  $\text{H}_2\text{SO}_4$  b)  $\text{CH}_2\text{F}_2$  c)  $\text{CO}_2$   
 26. Explain diagonal relationship with example.  
 27. Distinguish ortho and para hydrogen.  
 28. State Graham's law of diffusion and give its mathematical expression.  
 29. Write the characteristics of Gibb's free energy.  
 30. Derive the value of  $K_p$  and  $K_c$  for the synthesis of HI.  
 31. Describe optical isomerism with suitable example.  
 32. How will you detect sulphur in an organic compound?  
 33. What are electrophiles and nucleophiles? Give suitable examples for each.

**PART - IV**

34. a) i) Define Avogadro number [5 x 5 = 25]  
 ii) The density of carbon dioxide is equal to 1.965 kgm<sup>-3</sup> at 273 K and 1 atm pressure. Calculate the molar mass of  $\text{CO}_2$ . (OR)  
 b) Write a note on quantum numbers.  
 35. a) Explain the Pauling method for the determination of ionic radius. (OR)  
 b) Hydrogen peroxide can act as oxidizing agent as well as reducing agent, Substantiate this statement with suitable example.  
 36. a) i) Explain why there is no hydrogen ( $\text{H}_2$ ) in our atmosphere.  
 ii) Which of the following gases would you expect to deviate from ideal behavior under the condition of low temperature,  $\text{F}_2$ ,  $\text{Cl}_2$  or  $\text{Br}_2$ . Explain. (OR)  
 b) Explain Born-Haber cycle to calculate lattice enthalpy of sodium chloride crystal.  
 37. a) i) State third law of thermodynamics.  
 ii) Explain how will you predict the direction of an equilibrium reaction. (OR)  
 b) Derive the relationship between  $K_p$  and  $K_c$ .  
 38. a) i) Give the IUPAC name of the following.
- 1)  $\text{CH}_3\text{OCH}_3$  2)  $\text{CH}_3-\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{CHO}$  3)  $\text{CH}_3-\text{C}\equiv\text{C}-\underset{\text{Cl}}{\text{CH}}-\text{CH}_3$

- ii) 0.24g of an organic compound gave 0.287 g of silver chloride in the carius method. Calculate the percentage of chlorine in the compound. (OR)  
 b) i) Write a note on homologous series. ii) Explain electromeric effect.