

HTVM

# HALF YEARLY EXAMINATION - 2024

**XII** - Std

**CHEMISTRY**

Marks : 70

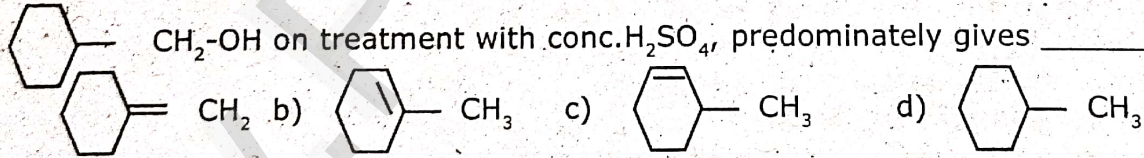
Time : 3.00 Hrs

**PART - A**

15 x 1 = 15

**Answer All :-**

- Considering Ellingham diagram, which of the following metals can be used to reduce alumina?
  - Fe
  - Cu
  - Mg
  - Zn
- The compound that is used in nuclear reactors as protective shields and control rods is
  - metal boride
  - metal oxides
  - metal carbonates
  - metal carbide
- Match the following.
 

| Compound               | Shape               | A  | B   | C   | D  |
|------------------------|---------------------|----|-----|-----|----|
| i) XeF <sub>2</sub>    | A] Pyramidal        | a) | i   | iii | iv |
| ii) XeF <sub>4</sub>   | B] linear           | b) | iv  | i   | ii |
| iii) XeOF <sub>4</sub> | C] Square planar    | c) | iii | ii  | iv |
| iv) XeO <sub>3</sub>   | D] Square pyramidal | d) | ii  | iii | I  |
- In acid medium, potassium permanganate oxidises oxalic acid to
  - oxalate
  - carbon-dioxide
  - acetate
  - acetic acid
- Which is the correct increasing order of crystal field splitting power of ligands.
  - H<sub>2</sub>O < Cl<sup>-</sup> < NH<sub>3</sub> < CO < en
  - en < Cl<sup>-</sup> < H<sub>2</sub>O < NH<sub>3</sub> < CO
  - Cl<sup>-</sup> < H<sub>2</sub>O < NH<sub>3</sub> < en < CO
  - CO < NH<sub>3</sub> < H<sub>2</sub>O < en < Cl<sup>-</sup>
- The ratio of close packed atoms to tetrahedral hole in cubic packing is
  - 1:1
  - 1:2
  - 2:1
  - 1:4
- The decomposition of phosphine (PH<sub>3</sub>) on tungsten at low pressure is a first order reaction. It is because the
  - rate is proportional to the surface coverage
  - rate is inversely proportional to the surface coverage
  - rate is independent of the surface coverage
  - rate of decomposition is slow
- The solubility of AgCl(s) with solubility product 1.6 x 10<sup>-10</sup> in 0.1M NaCl solution would be
  - 1.26 x 10<sup>-5</sup> M
  - 1.26 x 10<sup>-9</sup> M
  - 1.6 x 10<sup>-11</sup> M
  - Zero
- The equivalent conductance of M/36 solution of weak monobasic acid is 6 mho cm<sup>2</sup> equivalent<sup>-1</sup> and at infinite dilution is 400 mho cm<sup>2</sup> equivalent<sup>-1</sup>. The dissociation constant of this acid is
  - 1.25 x 10<sup>-6</sup>
  - 6.25 x 10<sup>-6</sup>
  - 1.25 x 10<sup>-4</sup>
  - 6.25 x 10<sup>-5</sup>
- In Haber's process of the manufacture of ammonia \_\_\_\_\_ acts as catalytic poison.
  - H<sub>2</sub>S
  - Fe
  - Mo
  - As<sub>2</sub>O<sub>3</sub>
- 
 CH<sub>2</sub>-OH on treatment with conc.H<sub>2</sub>SO<sub>4</sub>, predominately gives \_\_\_\_\_
  - 
  - 
  - 
  -
- Assertion (A) : Benz aldehyde undergoes friedel-crafts reaction in presence of CH<sub>3</sub>Cl / anhy AlCl<sub>3</sub> and gives m-substituted derivative  
Reason (R) : -CHO group in benzaldehyde is deactivating gp and therefore it is m- directing.
  - Both A and R are correct. R is correct explanation of A
  - Both A and R are correct. R is not correct explanation of A
  - A is correct R is incorrect
  - A is incorrect R is correct
- Which one of the following is most basic?
  - 2,4 - dichloro aniline
  - 2,4 - dimethyl aniline
  - 2,4 - dinitro aniline
  - 2,4 - dibromo aniline

14. Which one of the following is incorrectly matched  
 a) Vit A - night blindness b) Vit B<sub>2</sub> - cheilosis c) Vit B12 - Convulsions d) Vit D - Rickets
15. Insulin, a hormone chemically is  
 a) Fat b) steroid c) Protein d) Carbohydrates

**PART - B****Answer any Six Questions. Question No 24 is Compulsory****6 x 2 = 12**

16. What is calcination? Give example.
17. Complete the following (i)  $\text{HCOOH} + \text{H}_2\text{SO}_4 \rightarrow ?$  (ii)  $\text{Al}_2\text{O}_3 + \text{C} + \text{Cl}_2 \rightarrow ?$
18. Explain the bleaching action of  $\text{Cl}_2$ .
19. Briefly explain the process by which charge of sol particles can be found out?
20. Differentiate between order and molecularity.
21. Give note on Urotrophine. Give its use.
22. How do antiseptics differ from disinfectant?
23. Why does  $p^{ka}$  of ethanol is more than phenol.
24. Calculate the  $p^H$  of  $1.5 \times 10^{-3}$  M solution of  $\text{Ba}(\text{OH})_2$ .

**PART - C****Answer any Six Questions. Question No 33 is Compulsory****6 x 3 = 18**

25. Why do d-block elements show variable oxidation states?
26. List out uses of Helium.
27. Explain Ionisation and Linkage isomerism.
28. Give note on Schottky defect.
29. A Zero order reaction is 20% completed in 20 min. Calculate rate constant. In what time will reaction is 80% completed.
30. State Faraday's I and II law of electrolysis.
31. Classify the following into mono, di and polysaccharide.  
 i. Starch ii. Fructose iii. Sucrose iv. Lactose v. Heparin vi. Galactose
32. Explain Cannizaro's reaction with mechanism.
33.  $\text{CH}_3\text{Br} \xrightarrow{\text{NaN}_3} \text{A} \xrightarrow{\text{LiAlH}_4} \text{B} \xrightarrow{\text{CHCl}_3} \text{C}$  (foul Smell Compound) Identify A, B and C.

**PART - D****Answer All Questions :-****5 x 5 = 25**

34. a) i) Explain Hall-Herold process of extraction of Aluminium (3)  
 ii) How will you purify Nickel by Mond's process (2) [OR]  
 b) i) Differentiate between lanthanoids and actinoids. (3)  
 ii) Give a test for borate radical (2)
35. a) Calculate Hybridisation, Geometry and magnetic moment of  $[\text{Fe}(\text{CN})_6]^{4-}$  and  $[\text{FeF}_6]^{4-}$  using VB theory (5) [OR]  
 b) i) Explain packing efficiency in bcc crystal. (3)  
 ii) Draw structure of Marshall's acid and Caro's acid (2)
36. a) i) How will you find  $P^H$  of buffer solution by Henderson equation (3)  
 ii) What is the function of  $\text{H}_2\text{-O}_2$  in fuel cell. (2) [OR]  
 b) i) Derive Integrated rate law for first order kinetics. (3)  
 ii) Explain Intermediate compound formation theory. (2)
37. a) i)  $\text{C}_6\text{H}_6\text{O}$ (A) gives violet colour with neutral  $\text{FeCl}_3$ . A with sodium, followed by reaction with methyl bromide gives  $\text{B}[\text{C}_7\text{H}_8\text{O}]$ . B on nitration gives C (major product). Find A, B, C and write reactions. (3)  
 ii) convert A] Glycol  $\longrightarrow$  dioxane B] Glycol  $\longrightarrow$  Ethene. (2) [OR]  
 b) i) How will you prepare benzoic acid from the following  
 A]  $\text{CO}_2$  B] Toluene C] Benzyl alcohol (3)  
 ii) Explain Gabriel-Phthalimide synthesis to prepare primary amine (2)
38. a) Elucidate the structure of Glucose (5) [OR]  
 b) Explain the preparation of the following polymers from suitable monomers. (5)  
 i) PAN ii) Buna-N iii) Buna-S iv) Teflon v) Nylon 6,6