

12

Time 3 00 hrs.

# First Revision Examination - 2024

## CHEMISTRY

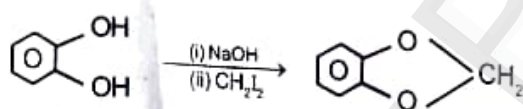
Max. Marks : 70

## PART - I

15 x 1 = 15

Choose the correct answer

- Titanium is refined by.....method.  
a) Van Arkel Process b) Smelting c) Zone refining d) Distillation
- $AlF_3$  is soluble in HF only in the presence of KF. It is due to the formation of  
a)  $K_3[AlF_3H_3]$  b)  $K_3[AlF_6]$  c)  $AlH_3$  d)  $K[AlF_3H]$
- Which one of the following order is correct for the oxidising power of oxoacids?  
a)  $HOX < HXO_2 < HXO_3 < HXO_4$  b)  $HXO_4 > HXO_3 > HXO_2 > HOX$   
c)  $HOX > HXO_2 > HXO_3 > HXO_4$  d)  $HOX > HXO_2 > HOX_3 > HXO_4$
- Potassium permanganate changes.....in Neutral, basic and acidic medium.  
a)  $MnO_2, Mn^{+2}, MnO_4^{2-}$  b)  $Mn^{+2}, MnO_2, MnO_4$  c)  $MnO_4^{2-}, Mn^{+2}, MnO_2$  d)  $MnO_2, MnO_4^{2-}, Mn^{+2}$
- Crystal field stabilization energy (CFSE) for high spin  $t_2^3g e^2g$  in  $[Fe(H_2O)_6]^{+3}$  complex is  
a) 0 b)  $-2\Delta_0 + 2P$  c)  $-0.6 \Delta_0$  d)  $2(P + \Delta_0)$
- The ionic radii of  $A^+$  and  $B^-$  are  $0.98 \times 10^{-10}$  m and  $1.81 \times 10^{-10}$  m. The coordination number of each ion in AB is  
a) 2 b) 6 c) 8 d) 4
- Consider the following statements  
i) increase in concentration of the reactant increases the rate of zero order reaction.  
ii) rate constant k is equal to collision frequency A if  $E_a = 0$   
iii) rate constant k is equal to collision frequency A if  $E_a = \infty$   
iv) a plot of  $\ln(k)$  Vs T is a straight line.  
v) a plot of  $\ln(k)$  vs  $(1/T)$  is a straight line with a positive slope.  
Correct statements are a) (ii) and (iv) b) (ii) and (v) c) (ii) only d) (i), (ii) and (v)
- Equal volumes of three acid solutions of PH 1, 2 and 3 are mixed in a vessel. What will be the  $H^+$  ion concentration in the mixture? a) 3 b)  $3.7 \times 10^{-2}$  c)  $10^{-6}$  d) 0.111
- According to Kohlraush's law, the molar conductivity at infinite dilution for a electrolyte is represented by the formula  $A \times B_y$ . which of the following is correct?  
a)  $\lambda^0_m A \times B_y = x(\lambda^0_m)Ay^+ + y(\lambda^0_m) Bx^-$  b)  $\lambda^0_m A \times B_y = (\lambda^0_m)Ay^+ + (\lambda^0_m) Bx^-$   
c)  $\lambda^0_m A \times B_y = x \lambda^0_m Ay^+ - (\lambda^0_m) Bx^-$  d) none of the above
- The shape of (tungstic acid sol)  $W_3O_5$  is a) spherical b) rod like c) disc (or) plate like d) cone like
- The reactions



- is an example of a) Wurtz reaction b) cyclic reaction c) Williamson synthesis d) Kolbe reaction
- Carboxylic acids have higher boiling points than aldehydes, Ketones and even alcohols of comparable molecular mass. is due to their  
a) more extensive association of carboxylic acid via Vanderwaals force of attraction b) formation of carboxylate ion.  
c) formation of intramolecular H-bonding.  
d) formation of intermolecular H-bonding
- Nitrobenzene on reaction with Conc.  $HNO_3 / H_2SO_4$  at 473K forms which one of the following products?  
a) 1, 3, 5 - trinitrobenzene b) 2, 4, 6 - trinitrobenzene c) 1, 2 - dinitrobenzene d) 1, 3 - dinitrobenzene
- The central dogma of molecular genetics states that the genetic information flows from  
a) Amino acids  $\rightarrow$  protein  $\rightarrow$  DNA b) DNA  $\rightarrow$  RNA  $\rightarrow$  proteins c) DNA  $\rightarrow$  carbohydrates  $\rightarrow$  proteins  
d) DNA  $\rightarrow$  RNA  $\rightarrow$  carbohydrates.
- Which of the following is a co-polymer?  
a) Buna-S b) PHBV c) Nylon - 2 Nylon - 6 d) all the above

## PART - II

6 x 2 = 12

Answer any six questions. Q.No. 24 is compulsory

16. Which type of metal oxides reacts to metal by aluminothermic process? Write the basic principle involved in this method.
17. Explain why fluorine always exhibit an oxidation state of -1?
18. Explain why compounds of  $\text{Cu}^{2+}$  are coloured but those of  $\text{Zn}^{2+}$  are colourless.
19. Differentiate crystalline solids and amorphous solids.
20. Explain common ion effect with an example.
21. Write note on Rieme: Tiemann reaction.
22. Write a test for primary amines.
23. What are the different types of RNA which are found in cell?
24. A solution of 0.10 M of a weak electrolyte is found to be dissociated to the extent of 1.20% at 25°C. Find the dissociation constant of the acid.

## PART - III

6 x 3 = 18

Answer any six questions. Q.No.33 is compulsory.

25. Write a note on
  - i) McAfee process
  - ii) Fischer - Tropsch Synthesis
26. Explain with suitable example of bleaching action of chlorine ( $\text{Cl}_2$ ) and sulphurdioxide ( $\text{SO}_2$ ).
27. What is coordination and ionisation isomerism in complex compounds? Give an example.
28. Define half-life period of a reaction. Show that for a first order reaction half-life is independent of initial concentration.
29. Explain the special characteristics of Enzyme catalysis.
30. How will you convert the following.
  - i) Ethane-1, 2-diol to 1, 4, - dioxane
  - ii) Propane - 1, 2, 3-triol to TNG.
31. Explain the reducing properties of formic acid with an example.
32. Write a note on (i) Zwitterion (ii) Formation of  $\alpha$ -helix.
33. Compound 'A' of M.F  $\text{C}_2\text{H}_3\text{N}$  reduced by  $\text{Na-Hg}/\text{C}_2\text{H}_5\text{OH}$  to give 'B' of M.F  $\text{C}_2\text{H}_5\text{N}$ . Compound 'B' reacts with  $\text{HNO}_2$  to give 'C'. 'C' gives red colour in Victor Meyer test. Identify A, B & C.

## PART - IV

5 x 5 = 25

Answer all the questions.

34. a) Write a note on
  - (i) cyanide leaching
  - (ii) Electrolytic refining. (OR)
 b) (i) Explain the classification of silicones.  
 (ii) Write the differences between graphite and diamond.
35. a) (i) Explain chromylchloride Test.  
 (ii) What is lanthanide contraction? Write their consequences. (OR)  
 (OR)
  - b) (i) What is crystal field stabilization energy (CFSE)?
  - (ii) Based CFT explain why  $[\text{Ni}(\text{CN})_4]^{2-}$  is diamagnetic, while  $[\text{Ni}(\text{Cl}_4)]^{2-}$  is paramagnetic.
36. a) (i) Explain the effect of catalyst on reaction rate with an example.  
 (ii) For a reaction  $x + y + z \rightarrow \text{products}$  the rate law is given by  $\text{rate} = k[\text{x}]^{1/2} [\text{y}]^{2/3}$ . What is the overall order of the reaction with respect to z. (OR)
  - b) (i) Derive an expression for Henderson - Hasselbalch equation.
  - (ii) Write the differences between Lewis acid and Lewis bases.
37. a) (i) Write a note on Electrophoresis.  
 (ii) Explain the factors affecting adsorption. (OR)
  - b) (i) Write a short note on Galvanic cell rotation with suitable example.
  - (ii) Explain the method to measure an electrode potential of an electrode.
38. a) (i) How will you distinguish 1°, 2° and 3° amines by the reaction with nitrous acid?  
 (ii) What is chloropicrin? How it is prepared? Mention its use.  
 b) (i) Explain the mechanism of Cannizzaro's reaction (3)  
 (ii) What is trans esterification? Give example. (2)