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Register No. [

Second Revision Examination - 2024

Time : 3.00 Hrs

CHEMISTRY

Marks : 70

PART - I

15x1=15

Choose the correct answer.

- Which one of the following orders is correct of the bond dissociation enthalpy of halogen molecules?
a) $\text{Br}_2 > \text{I}_2 > \text{F}_2 > \text{Cl}_2$ b) $\text{Cl}_2 > \text{Br}_2 > \text{F}_2 > \text{I}_2$ c) $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$ d) $\text{I}_2 > \text{Br}_2 > \text{Cl}_2 > \text{F}_2$
- Boric acid is an acid because its molecule
a) contains replaceable H^+ ion b) gives up a proton c) combines with proton to form water molecule
d) accepts OH^- from water, releasing proton
- Considering Ellingham diagram, which of the following metals can be used to reduce alumina?
a) Fe b) Zn c) Mg d) Cu
- In calcium Fluoride, having the fluorite structure the coordination number of Ca^{2+} ion and F^- ion are
a) 4 and 8 b) 8 and 4 c) 4 and 2 d) 6 and 6
- The addition of a catalyst during a chemical reaction alters which of the following quantities?
a) Enthalpy b) Activation energy c) Entropy d) Internal energy
- Which of the following fluoro compounds is most likely to behave as a Lewis base?
a) CF_4 b) SiF_4 c) BF_3 d) PF_3
- On which of the following properties does the coagulating power of an ion depend?
a) Both magnitude and sign of the charge on the ion b) Size of the ion alone c) the magnitude of the charge on the ion alone d) Sign of charge on the ion alone
- Which of the following pairs has the same size?
a) Fe^{2+} , Ni^{2+} b) Zr^{4+} , Ti^{4+} c) Zr^{4+} , Hf^{4+} d) Zn^{2+} , Hf^{4+}
- The IUPAC name of the complex $[\text{Ag}(\text{H}_2\text{O})_2][\text{Ag}(\text{CN})_2]$ is
a) dicyanidosilver(II) diaquaargentate(II) b) diaquasilver(II)dicyanidoargentate(II)
c) dicyanidosilver(I) diaquaargentate(I) d) diaquasilver(I)dicyanidoargentate(I)
- The number of Faradays(F) required to produce 20g of calcium from molten CaCl_2 (Atomic mass of $\text{Ca}=40\text{g mol}^{-1}$) is
a) 1 b) 2 c) 3 d) 4
- Which of the following compounds and reaction with methyl magnesium bromide will give tertiary alcohol
a) benzaldehyde b) propanoic acid c) methyl propanoate d) acetaldehyde
- Predict the product Z in the following series of reaction
Ethanoic acid $\xrightarrow{\text{PCl}_5}$ X $\xrightarrow{\text{C}_2\text{H}_5}$ Y i) $\xrightarrow{\text{CH}_3\text{MgBr}}$ Z ii) H_2O
a) $(\text{CH}_3)_2\text{C}(\text{OH})\text{C}_2\text{H}_5$ b) $(\text{CH}_3)_2\text{CH}(\text{OH})\text{C}_2\text{H}_5$ c) $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{-CH}_3$ d) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$
- Which one of the following is most basic?
a) 2,4-dichloroaniline b) 2,4-dimethylaniline c) 2,4-dinitroaniline d) 2,4-dibromoaniline
- Sucrose on hydrolysis gives
a) β -glucose + α -D Fructose b) α -D-glucose + β -D-glucose c) α -D-glucose + β -D-Fructose
d) α -D-Fructose+ β -D-Fructose
- Which of the following polymers prepared by addition polymerisation
a) Dacron b) Teflon c) Nylon -6,6 d) Novolac

PART - II

Answer any 6 questions. Question No. 24 is compulsory.

6x2=12

- Write Limitation of Ellingham diagram.
- Why HF is not stored in glass bottle.

18. Out of $\text{Lu}(\text{OH})_3$ and $\text{La}(\text{OH})_3$ which is more basic and why?
19. Give any three characteristics of ionic crystal?
20. State Kohlraush's Law.
21. What is Electrophoresis?
22. What happens when 2 methoxy-2 methyl propane treated with dil HI.
23. Write short note on Haloform reaction.
24. $\text{C}_6\text{H}_5\text{CHO} + \text{HCHO} \xrightarrow{50\% \text{ NaOH}} \text{A} + \text{B}$ Identify A and B

PART - III

Answer any 6 questions. Question No. 33 is compulsory.

6x3=18

25. How do antiseptics differ from disinfectants?
26. Write a short note on Gabriel Phthalimide synthesis.
27. What is Urotropine. How to prepare it.
28. Show that in case of first order reaction, the time required for 99% completion is nearly ten times the time required for half completion of the reaction.
29. Write any difference between chemical and physical absorption.
30. Write short note on Zeolites?
31. Discuss briefly the nature of bonding in metal carbonyls.
32. Which is more stable? Mn^{3+} or Mn^{2+} explain.
33. Calculate the PH of 0.1 mol of NH_4OH solution dissociation constant of NH_4OH 1.8×10^{-5}

PART - IV

Answer all the questions:

5x5=25

34. a) i) Explain zone refining process with an example. (3)
ii) How will you identify borate radical? (2) (OR)
b) i) Based on VB theory explain why $[\text{Cr}(\text{NH}_3)_6]^{3+}$ is paramagnetic, while $[\text{Ni}(\text{CN})_4]^{2-}$ is diamagnetic. (3)
ii) Which type of isomerism is exhibited by the following compound. (2)
a) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ b) $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Cl}$
35. a) i) Write the correct order of thermal stability hydrogen halide. HI, HF, HBr, HCl. (2)
ii) Why d-block element shows variable oxidation state. (OR)
b) i) Calculate the percentage efficiency of packing in case of BCC crystal. (3)
ii) Write a note on Schottky defect. (2)
36. a) i) Discuss Henderson –Hasselbalch equation. (3)
ii) Write a note on sacrificial protection. (2) (OR)
b) i) Explain the function of mercury button cell. (3)
ii) Write Arrhenius equation and explain the term involved. (2)
37. a) i) Derive Integrated Rate Law for a first order reaction.
 $\text{A} \rightarrow \text{Product}$ (3)
ii) Define Solubility product. (2) (OR)
b) i) Write the difference between DNA and RNA. (2)
ii) Write the structural elucidation of fructose. (3)
38. i) How is Buna-S prepared? (2)
ii) How to convert benzene diazonium chloride into (3)
a) Chlorobenzene b) Biphenyl c) Nitrobenzene (OR)
b) i) Complete the following reaction.
$$\text{C}_6\text{H}_5\text{OH} \xrightarrow{\text{Zn dust}} \text{A} \xrightarrow[\text{Anhydrous AlCl}_3]{\text{CH}_3\text{Cl}} \text{B} \xrightarrow{\text{acid KMnO}_4} \text{C} \quad (3)$$

ii) How will you prepare Malachitegreen from benzaldehyde. (2)