

12 - Std

SECOND MID TERM TEST - 2023

CHEMISTRY

Time: 1.30 Hrs.

Marks: 35

I. Choose the most suitable answer from the given four alternatives:

10×1=10

- Oxidation state of Iron and the charge on the ligand NO in $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]\text{SO}_4$ are
a) +2 and 0 respectively b) +3 and 0 respectively c) +3 and -1 respectively d) +1 and +1 respectively
- Among the statements A to D the incorrect ones are
A) Octahedral Co(III) complex with strong field ligands have very high magnetic moment.
B) When $\Delta_o < P$, the d-electron configuration of Co(III) in octahedral complex is $t_{2g}^4 e_g^2$.
C) Wavelength of light absorbed by $[\text{Co}(\text{en})_3]^{3+}$ is lower than that of $[\text{CoF}_6]^{3-}$.
D) If the Δ_o for an octahedral complex of Co(III) is $18,000 \text{ cm}^{-1}$ then Δ_t for its tetrahedral complex with the same ligand will be 16000 cm^{-1} . a) A and D only b) C and D only c) B and C only d) A and B only
- Assertion** : Pure Iron when heated in dry air is converted with a layer of rust.
Reason : Rust has the composition Fe_2O_3 .
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If 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.
- The logarithm of the equilibrium constant of the cell reaction corresponding to the cell $X/X_{(\text{aq})}^{2+} // Y_{(\text{aq})}^{2+}/Y$ with the standard reduction potential $E_{\text{cell}}^0 = 1.2\text{V}$ a) 12.5 b) 21.5 c) 40.5 d) 47.2
- For freudlich isotherm a graph of $\log x/m$ is plotted against $\log P$. The slope of the line and its y-axis intercept respectively corresponds to a) $1/n, k$ b) $\log 1/n, k$ c) $1/n, \log k$ d) $\log 1/n \log k$
- Nitrobenzene on reaction with conc. $\text{HNO}_3 / \text{H}_2\text{SO}_4$ at $80-100^\circ\text{C}$ forms which one of the following products?
a) 1, 4 - dinitro benzene b) 2, 4, 6 - trinitro benzene
c) 1, 2 - dinitro benzene d) 1, 3 - dinitro benzene
- Which one of the following will not undergo Hofmann bromamide reaction
a) $\text{CH}_3\text{CONHCH}_3$ b) $\text{CH}_3\text{CH}_2\text{CONH}_2$ c) CH_3CONH_2 d) $\text{C}_6\text{H}_5\text{CONH}_2$
- The central dogma of molecular genetics states that the genetic information flows from
a) Amino acids \rightarrow Protein \rightarrow DNA b) DNA \rightarrow Carbohydrates \rightarrow Proteins
c) DNA \rightarrow RNA \rightarrow Proteins d) DNA \rightarrow RNA \rightarrow Carbohydrates
- In aqueous solution of amino acids mostly exists in
a) $\text{NH}_2 - \text{CH}(\text{R}) - \text{COOH}$ b) $\text{NH}_3^+ - \text{CH}(\text{R}) - \text{COO}^-$ c) $\text{H}_2\text{N}^+ - \text{CH}(\text{R}) - \text{COOH}$ d) $\text{H}_2\text{N}^+ - \text{CH}(\text{R}) - \text{COO}^-$
- How many faradays of electricity are required for the following reaction to occur $\text{MnO}_4^- \rightarrow \text{Mn}^{2+}$
a) 5F b) 3F c) 1F d) 7F

II. Answer any 3 of the following: (Question Number 12 is compulsory)

3×2=6

- Why does conductivity of a solution decrease on dilution of the solution?
- Find A and B in the reaction $\text{CH}_3\text{CH}_2\text{Br} \xrightarrow{\text{AgCN}} \text{A}$ and $\text{CH}_3\text{CH}_2\text{Br} \xrightarrow{\text{KCN}} \text{B}$
- Define Equivalent conductance.
- How will you convert nitrobenzene into (a) 1, 3, 5 - trinitrobenzene (b) o and p - nitro phenol.
- What is ion exchange?

III. Answer any 3 of the following: (Question Number 20 is compulsory)

3×3=9

- Write the IUPAC names for the following complexes. a) $\text{Na}_2[\text{Ni}(\text{EDTA})]$ b) $[\text{Ag}(\text{CN})_2]^-$ c) $[\text{Co}(\text{ONO})(\text{NH}_3)_5]^{2+}$
- A solution of $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ is green, whereas a solution of $[\text{Ni}(\text{CN})_4]^{2-}$ is colorless?
- a) What type of isomerism is shown by the complex $[\text{Cr}(\text{H}_2\text{O})_6] \text{Cl}_3$?
b) On the basis of crystal field theory write the electronic configuration for d^2 ion if $\Delta_o > P$?
c) Write the hybridisation and shape of $[\text{CoF}_6]^{3-}$? [atomic number of cobalt is 27]
- Explain factors affecting electrolytic conductance.
- Write short notes on the following: (a) Carbylamine reaction (b) Mustard oil reaction

IV. Answer all the questions:

2×5=10

- a) Based on VB theory explain why $[\text{Cr}(\text{NH}_3)_6]^{3+}$ is paramagnetic, while $[\text{Ni}(\text{CN})_4]^{2-}$ is diamagnetic. (2)
b) Derive Nernst equation. (3) (OR)
c) Write the special characteristics of enzyme catalysed reaction. (2)
d) Give the differences between DNA and RNA. (2)
- a) Write a note on catalytic poison. (2) b) Describe adsorption theory of catalysis. (3) (OR)
c) Why Aniline does not undergo Friedel - Crafts reaction? (2)
d) How will you distinguish between primary, secondary and tertiary diphtic amines?

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single pg