

GOVERNMENT OF KARNATAKA
DEPUTY DIRECTOR, DEPT. OF SCHOOL EDUCATION (PRE-UNIVERSITY)
PUC-II YEAR PREPARATORY EXAMINATION-2024

Time : 3 Hours 15 Minutes

SUBJECT : CHEMISTRY (34)

MARKS : 70

- Instructions :**
- The question paper has 5 parts All parts are compulsory.
 - a) PART-A Carries 20 marks, Each question carries 1 mark. b) PART-B Carries 6 marks, Each question carries 2 marks
c) PART-C Carries 15 marks, Each question carries 3 marks. d) PART-D Carries 20 marks, Each question carries 5 marks.
e) Part-E carries 9 marks, Each question carries 3 marks.
 - In part-A questions, **first attempted answer** will be considered for awarding marks.
 - Write balanced chemical equations and draw neat labelled diagrams wherever necessary.
 - Use log tables and simple calculator if necessary. (Use of scientific calculator is not allowed)

PART - A

I. Select the correct option from the given choices :

15X1=15

- All form ideal solution except
a) n-hexane + n-heptane
c) benzene + toluene
b) Chloro ethane + bromo ethane
d) acetone + chloro form
- On which of the following the magnitude of conductivity of a electrolytic solution does not depends ?
a) Pressure
c) Temperature
b) concentration of electrolyte
d) Nature of electrolyte
- The electrolyte used in lead storage battery is
a) $\text{NH}_4\text{Cl} + \text{ZnCl}_2$
c) $\text{KOH} + \text{ZnO}$
b) 38% H_2SO_4
d) 38% HCl
- The unit of rate constant for a first order reaction is
a) S^{-1}
c) $\text{mol}^{-1} \text{L. S}^{-1}$
b) $\text{mol. L}^{-1} \text{S}^{-1}$
d) mol. L^{-1}
- The common oxidation state of lanthanoids is
a) +2
c) +3
b) +4
d) +5
- In $[\text{NiCl}_4]^{-2}$ complex the hybridisation of nickel is
a) d^2sp^3
c) sp^3d^2
b) sp^3
d) dsp^2
- When chloroethane is reacted with alcoholic potash the hydrocarbon liberated is
a) ethane
c) butene
b) propene
d) ethene
- The enzyme that convert glucose and fructose into ethanol is
a) Zymase
c) invertase
b) diastase
d) maltase
- When phenol is distilled with zinc dust, the chief product formed is
a) Toluene
c) benzene
b) benzoquinone
d) aniline
- The catalyst used in Rosenmund reduction is
a) Cu_2Cl_2 in conc. HCl
c) Zn-Hg in conc. HCl
b) Anhydrous AlCl_3
d) Pd-BaSO₄
- Soda lime is a mixture of
a) NaOH + MgO
c) KOH + ZnO
b) NaOH + CaO
d) KOH + CaO
- Hinsberg's reagent is
a) $\text{C}_6\text{H}_5\text{SO}_2$
c) $\text{C}_6\text{H}_5\text{SO}_2 \text{Cl}$
b) $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}_2$
d) $\text{C}_6\text{H}_5\text{Cl}$
- Amide reacts with bromine and alkali to form primary amine. The reaction is known as
a) Hoffmann reaction
c) Etard reaction
b) Kolbe's reaction
d) Cannizzaro reaction
- Cellulose is a polymer of
a) Fructose
c) sucrose
b) ribose
d) glucose
- Among the following vitamins the one whose deficiency causes rickets is
a) Vitamin A
c) Vitamin B
b) Vitamin D
d) Vitamin C

II. Fill in the blanks by choosing correct appropriate word from those given in bracket : 5X1=5
(amylose, R-Mg-X, Manganese, Osmotic pressure, Collision frequency)

- An example for colligative property is
- The number of collisions per second per unit volume of reaction mixture is called as
- In 3-d series the highest oxidation state is shown by the element
- The general formula of Grignard reagent is
- The water soluble component of starch is

PART-B

III. Answer ANY THREE of the following. Each question carries two marks.

3X2=6

- Give any two differences between ideal and non ideal solutions.
- What is Pseudo first order reaction ? Give example.

(P.T.O)

- 23) What is ionisation isomerism ? Give example.
- 24) Explain Wurtz reaction.
- 25) Explain Cannizzaro reaction of benzaldehyde.
- 26) Write the Haworth structure of sucrose.

PART-C

IV. Answer ANY THREE of the following. Each question carries three marks. 3X3=9

- 27) Write the balanced chemical equations used in the preparation of potassium dichromate from chromite ore.
- 28) Calculate the spin only magnetic moment of Cu^{+2} ion. (At. No. of copper is 29)
- 29) Give any three differences between lanthanoids and actinoids.
- 30) Write any three postulates of Werner's theory of co-ordination compounds.
- 31) Using Valence bond theory, explain geometry hybridisation and magnetic property of $[\text{Ni}(\text{CN})_4]^{2-}$ ion (At. No. of nickel is 28)
- 32) a) What is ligand ? Give an example for polydentate ligand.
b) Write the IUPAC name of $\text{K}_3[\text{Fe}(\text{CN})_6]$

V. Answer ANY TWO of the following. Each question carries three marks. 2X3=6

- 33) a) State Henry's law and write its mathematical form.
b) What are isotonic solutions ?
- 34) Explain the construction and working of standard hydrogen electrode. Draw neat labelled diagram.
- 35) Write the balanced chemical reactions taking place at anode, Cathode and overall cell reaction in lead storage battery.
- 36) Derive an integrated rate equation for the rate constant of a zero order reaction.

PART-D

VI. Answer ANY FOUR of the following. Each question carries five marks. 4X5=20

- 37) a) Explain $\text{S}_\text{N}1$ mechanism of hydrolysis of tertiary butyl bromide.
b) Explain Wurtz-Fittig reaction. (3+2)
- 38) a) Explain the mechanism of dehydration of ethanol to ethene.
b) Explain Williamson ether synthesis. (3+2)
- 39) a) Explain the ^{preparation}proportion of phenol from cumene.
b) How do you convert phenol to picric acid ? Write equation. (3+2)
- 40) a) Explain Etard reaction.
b) Explain Clemmensen reduction.
c) What is formalin ? (2+2+1)
- 41) a) What is esterification ? Write its general equation.
b) Explain nitration of benzoic acid.
c) Give the IUPAC name of formic acid. (2+2+1)
- 42) a) Explain carbylamine reaction of methylamine.
b) Explain diazotisation.
c) Write the general formula of diazonium salt. (2+2+1)
- 43) a) Give one chemical test each for the following in glucose.
i) Presence of straight chain of 6 carbon atoms. ii) Presence of hydroxyl groups.
b) Give any two differences between DNA and RNA.
c) What is denaturation of protein ? (2+2+1)

PART-E

VII. Answer ANY THREE of the following. Each question carries three marks. 3X3=9

- 44) 1 g of a non electrolyte solute dissolved in 50 g of benzene lowered the freezing point of benzene by 0.4 K. Calculate the molar mass of the solute. (Given : K_f for benzene = 5.12 K. Kg. mol^{-1})
- 45) When 2 g of non volatile solute is dissolved in 78 g of benzene, benzene has a vapour pressure of 195 mm of Hg. The vapour pressure of pure benzene is 200 mm of Hg. Calculate the molar mass of the solute (molecular mass of benzene = 78)
- 46) Calculate ΔG° for the following cell reaction at 298 K $\text{Mg} + 2\text{Ag}^+ \longrightarrow \text{Mg}^{2+} + 2\text{Ag}$
(Given : $E^\circ_{\text{Mg}} = -2.37\text{V}$ $E^\circ_{\text{Ag}} = +0.80\text{V}$ $F = 96500\text{C}$)
- 47) Calculate the emf of the cell represented below. $\text{Zn} / \text{Zn}^{2+}(0.1\text{M}) \parallel \text{Cu}^{2+}(1\text{M}) / \text{Cu}$ at 298 K
(Given : $E^\circ_{\text{Cu}} = 0.34\text{V}$ $E^\circ_{\text{Zn}} = -0.76\text{V}$)
- 48) Half life period of a first order reaction is 30 minutes. Calculate the time required for 90% completion of the reaction.
- 49) The rate constant of a particular reaction doubles when the temperature is increased from 300 K to 310 K. Calculate the energy of activation of the reaction. (Given : $R = 8.314\text{ JK}^{-1}\text{ mol}^{-1}$)