

(English Version)

CHEMISTRY
MARCH
2015

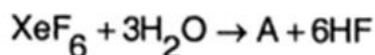
- Instructions:**
- The question paper has **four** Parts. **All** Parts are **compulsory**.
 - Part – **A** carries **10** marks. Each question carries **one** mark.
Part – **B** carries **10** marks. Each question carries **two** marks.
Part – **C** carries **15** marks. Each question carries **3** marks.
Part – **D** carries **35** marks. Each question carries **five** marks.
 - Write **balanced** chemical equations and draw diagrams **wherever** necessary.
 - Use **log** tables and simple calculator if necessary.
(Use of scientific calculator is **not** allowed.)

PART – A

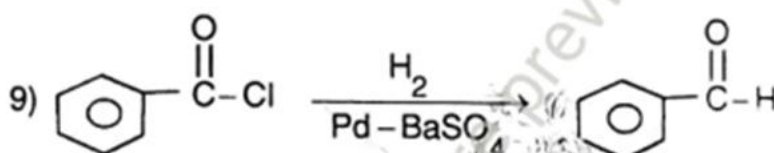
- I. Answer **all** the questions. **Each** question carries **one** mark. (Answer **each** question in **one** word or **one** sentence.) (10×1=10)
- At a given temperature and pressure nitrogen gas is more soluble in water than Helium gas. Which one of them has higher value of K_H ?
 - On mixing equal volumes of acetone and ethanol, what type of deviation from Raoult's law is expected ?
 - What happens to molar conductivity when one mole of KCl dissolved in one litre is diluted to five litres ?



- 4) What happens to the half life period for a first order reaction, if the initial concentration of the reactants is increased ?
- 5) Name the process usually employed for the purification of Nickel.
- 6) Identify the product 'A' in the following reaction



- 7) How many moles of AgCl will be precipitated when an excess of AgNO₃ solution is added to one molar solution of [CrCl(H₂O)₅]Cl₂ ?
- 8) Name the organic product formed when chlorobenzene is treated with sodium in dry ether.



Name the above reaction.

- 10) Deficiency of which vitamin causes the disease pernicious anaemia ?

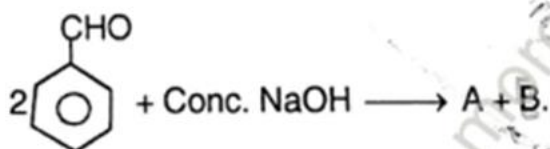
PART - B

II. Answer **any five** of the following. **Each** question carries **two** marks. **(5×2=10)**

- 11) What is meant by the term coordination number in solids ? What is the coordination number in a face centered cubic close packing structure ?
- 12) State Faraday's first law of electrolysis. For the electrode reaction $\text{Zn}^{2+} + 2\text{e}^- \longrightarrow \text{Zn}_{(s)}$, what quantity of electricity in coulombs required to deposit one mole of zinc.



- 13) A reaction is first order with respect to the reactant A and second order with respect to the reactant B in a reaction $A + B \rightarrow \text{product}$.
- Write the differential rate equation.
 - How is the rate of the reaction affected on increasing the concentration of B by two times ?
- 14) Give any two differences between lanthanoids and actinoids.
- 15) Name the product formed when phenol is treated with acidified solution of $\text{Na}_2\text{Cr}_2\text{O}_7$. Give equation.
- 16) Identify A and B in the following reaction :



- 17) What is the role of these as food additives ?
- Sodium benzoate
 - Aspartame.
- 18) Explain saponification of oils/fats with equation.

PART - C

III. Answer any five of the following. Each question carries three marks. (5×3=15)

- 19) Describe the three steps involved in the leaching of bauxite to get pure Alumina (equations not expected).



- 20) Write the equations involved in the preparation of nitric acid by Ostwald's process by maintaining the reaction conditions. 3
- 21) Complete the following equations :
- a) $\text{CH}_4 + 2\text{O}_2 \longrightarrow$ 1
- b) $2\text{Fe}^{3+} + \text{SO}_2 + 2\text{H}_2\text{O} \longrightarrow$ 1
- c) $\text{C}_{12}\text{H}_{22}\text{O}_{11} \xrightarrow{\text{Conc. H}_2\text{SO}_4}$ 1
- 22) a) Which is the strongest acid among the hydrogen halides ? Give one reason [X = F, Cl, Br, I]. 2
- b) Write the structure of Chloric acid (HClO_3). 1
- 23) Give reason (one each) for the following : 3
- a) Transition metals are good catalytic agent.
- b) Second ionisation enthalpy of copper is very high.
- c) The spin only magnetic moment of Sc^{3+} is zero (Z = 21).
- 24) Write the equations involved in the preparation of Potassium Dichromate from Chromite ore. 3
- 25) With the help of Valence bond theory account for hybridisation, geometry and magnetic property of $[\text{Ni}(\text{CN})_4]^{2-}$ complex ion [Z for Ni = 28]. 3
- 26) a) For the given complex $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$, write the IUPAC name and its ionisation isomer. 2
- b) Which set of d-orbitals of metal ion/atom experience more repulsion in octahedral field created by the ligand ? 1



PART – D

IV. Answer **any three** of the following. Each question carries **five** marks. (3×5=15)

27) a) Calculate the packing efficiency in a unit cell of Cubic Close Packing (CCP) structure. 4

b) Name the crystal defect which lowers the density in an ionic crystal. 1

28) a) A solution containing 18g of non-volatile non-electrolyte solute is dissolved in 200 g of water freezes at 272.07K. Calculate the molecular mass of solute. Given : $K_f = 1.86 \text{ K kg/mol}$.

freezing point of water = 273 K. 3

b) Define isotonic solution. What happens when the blood cell is dipped in a solution containing more than normal saline concentration ? 2

29) a) Calculate the EMF of the cell for the reaction



Given : $E^\circ \text{Mg}^{2+} / \text{Mg} = -2.37\text{V}$

$E^\circ \text{Ag}^+ / \text{Ag} = 0.80\text{V}$

$[\text{Mg}^{2+}] = 0.001\text{M}$; $[\text{Ag}^+] = 0.0001 \text{ M}$

$\log 10^5 = 5$. 4

b) What are fuel cells ? 1

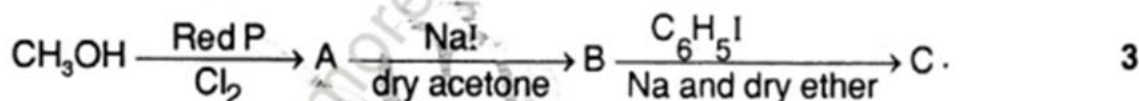


- 30) a) Derive integrated rate equation for the first order reaction. 3
- b) According to collision theory, what are the two factors that lead to effective collisions ? 2
- 31) a) Write any two differences between physisorption and chemisorption. 2
- b) Name the phenomenon/effect for the following :
- i) Colloidal particles are in zig-zag motion. 1
- ii) When an electrical potential is applied across two platinum electrodes dipping in a colloidal solution, particles move towards one or the other electrodes. 1
- iii) Scattering of light by colloidal sol. 1

V. Answer **any four** of the following. **Each** question carries **five** marks. (4×5=20)

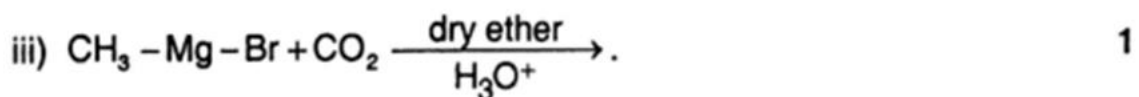
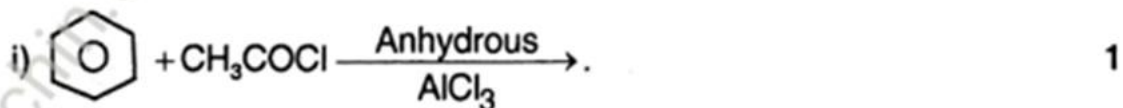
- 32) a) Write equations for the steps in S_N1 mechanism of the conversion of tert.butyl bromide into tert. butyl alcohol. 2

- b) Identify the products A, B and C in the following equation



- 33) a) Write the mechanism of acid catalysed dehydration of ethanol to ethene. 3
- b) Explain Williamson's reaction. Write the general equation. 2

- 34) a) Write the organic compound formed in the following equations.



- b) Explain HVZ (Hell-Volhard-Zelinsky) reaction with equation. 2



- 35) a) Identify the reactant 'A' in the following reaction :
$$A - 2R - X \longrightarrow R_4 N^+ X^-$$
 1
- b) Explain Hoffmann's bromamide degradation reaction for the preparation of methanamine. 2
- c) Which is more basic among aqueous solutions of aniline and ammonia ? Give one reason. 2
- 36) a) Write Haworth structure for maltose. 2
- b) What is meant by denaturation of proteins ? Which level of structure remains intact during denaturation of globular protein ? 2
- c) Name the base present only in DNA but not in RNA. 1
- 37) a) Write the partial structure of 3
- i) Neoprene
 - ii) Terylene (Dacron)
 - iii) Nylon - 6.
- b) Explain the preparation of Buna-N with equation. 2
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