



# Second PUC Chemistry March, 2015 Question Paper

(English Version)

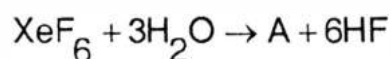
- Instructions:**
- The question paper has **four** Parts. **All** Parts are **compulsory**.
  - Part – **A** carries **10** marks. Each question carries **one** mark.  
Part – **B** carries **10** marks. Each question carries **two** marks.  
Part – **C** carries **15** marks. Each question carries **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

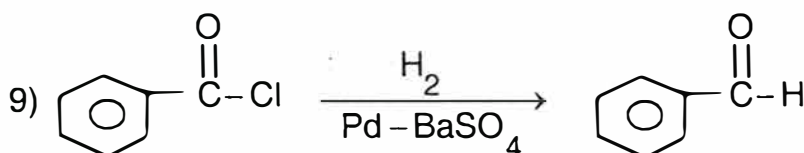
- Answer **all** the questions. **Each** question carries **one** mark. (Answer **each** question in **one** word or **one** sentence.) (10×1=10)
  - At a given temperature and pressure nitrogen gas is more soluble in water than Helium gas. Which one of them has higher value of  $K_H$  ?
  - On mixing 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 AgNO<sub>3</sub> solution is added to one molar solution of [CrCl (H<sub>2</sub>O)<sub>5</sub>] Cl<sub>2</sub> ?
- 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. **(5x2=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  $\text{Zn}^{2+} + 2\text{e}^- \longrightarrow \text{Zn}_{(\text{s})}$ , what quantity of electricity in coulombs required to deposit one mole of zinc.



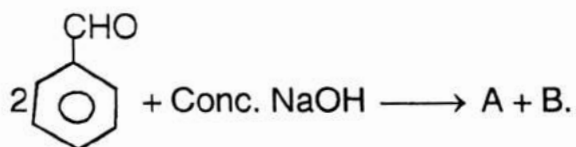
13) A reaction is first order with respect to the reactant A and second order with respect to the reactant B in a reaction  $A + B \rightarrow \text{product}$ .

- i) Write the differential rate equation.
- ii) 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 ?

- i) Sodium benzoate
- ii) 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 ( $\text{HClO}_3$ ). 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  $\text{Sc}^{3+}$  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 :  $E^0 \text{Mg}^{2+} / \text{Mg} = -2.37\text{V}$

$E^0 \text{Ag}^+ / \text{Ag} = 0.80\text{V}$

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

$\log 10^5 = 5$ . 4

b) What are fuel cells ? 1

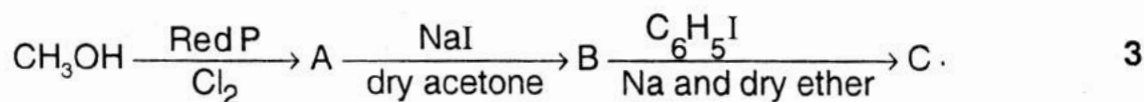


- 30) a) Derive integrated rate equation for the first order reaction. 3
- b) According to collision theory, what are the two factors that lead to effective collisions ? 2
- 31) a) Write any two differences between physisorption and chemisorption. 2
- b) Name the phenomenon/effect for the following :
- 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

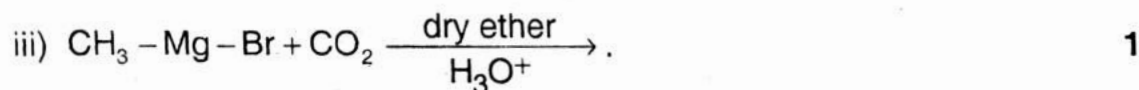
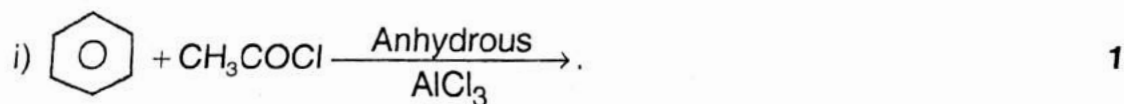
V. Answer **any four** of the following. **Each** question carries **five** marks. (4×5=20)

- 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 :  
$$A + 2 R - X \longrightarrow R_4 N^+ X^- .$$
 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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