FACULTY RECRUITMENT TEST

CATEGORY-C

Formal School Education/XI, XII

CHEMISTRY

PAPER – B

Time: 60 Minutes. ***Maximum Marks: 40***

Name: ..... **Subject:**	**Marks:**	

Instructions:

- Attempt all questions.
- This question paper has two **Parts, I and II.** Each question of **Part I carries 2 marks** and of **Part II carries 5 marks.**
- Calculators and log tables are not permitted

PART – I

1. A hydrocarbon (A) decolorizes Br_2 in CCl_4 and adds up a molecule of H_2 in presence of Pt catalyst to give n-hexane. When (A) is oxidized vigorously with $KMnO_4$ a single molecule of carboxylic acid salt with three carbon atoms is isolated. Give the name of (A) and the salt formed.

2. What is the equivalent weight of $KMnO_4$ in neutral medium?

3. 0.1 millimoles of $CdSO_4$ are present in 10 ml acid solution of 0.08 N HCl. Now H_2S is passed to precipitate all the Cd^{+2} ions. What is the pH of the solution after filtering off precipitate, boiling off H_2S and making the solution 100 ml by adding H_2O.

4. 0.5 gm fuming H_2SO_4 (oleum) is diluted with water. The solution is completely neutralized by 26.7 ml of 0.4 N NaOH. What is the percentage of free SO_3 in the sample?

5. $CCl_3CHO + HCHO \xrightarrow{\bar{O}H}$ A. What is A?

6. In a solid 'AB' having the NaCl structure, 'A' atoms occupy the corners of the cubic unit cell. If all the face-centred atoms along one of the axes are removed, What will be the resultant stoichiometry of the solid?

7. What is the product of the following reaction?

   $CH_3CH = CH_2 \xrightarrow[H_2O_2,\ \bar{O}H]{B_2H_6}$

8. A bottle of cold drink contains 200 mL liquid in which CO_2 is 0.1 M. Suppose CO_2 behaves like an ideal gas what is the volume of dissolved CO_2 at STP?

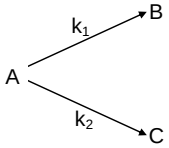
9. 0.85% eq. solution of $NaNO_3$ is apparently 90% dissociated. What is the osmotic pressure of solution at 300 K?

10. The activation energy of a reaction is 9kcal/mol. What will be the increase in the rate constant when its temperature is raised from 295 to 300K?

PART – II

1. An organic compound **A**, $C_6H_{10}O$, on reaction with CH_3MgBr followed by acid treatment gives compound **B**, which on ozonolysis gives compound **C**. **C** in presence of a base gives 1-acetyl cyclopentene **D**. The compound **B** on reaction with HBr gives compound **E**. Write the structures of compounds **A**, **B**, **C** and **E**. Show how **D** is formed from **C**.

2. A certain organic compound A decomposes by two parallel first order reactions.



such that $k_1 : k_2$ is 2:9. Calculate the concentration ratio of C to A if an experiment is started with A only and allowed to run for 2 hours $k_1 = 2 \times 10^{-5}$ sec^{-1}.

3. Equal volumes of ethylene glycol and water are mixed. Calculate the freezing point of such a solution. Given; ρ(ethylene glycol) = 1.113 g cm^{-3} and K_f (water) = 1.86 K kg mol^{-1}.

4. Compound (A) C_8H_9Cl is hydrolysed by aqueous KOH to form (B) $C_8H_{10}O$. (B) on mild oxidation gives (C) which gives positive iodoform test. (A) when treated with alcoholic KOH gives (D) which is a monomer of an important polymer. (C) when treated with $NaOH/Br_2$ followed by acidification give a white solid $C_7H_6O_2$ (E). Identify A to E.

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