TERM - II

SAMPLE QUESTION PAPER

BLUE PRINT

Time Allowed : 2 hours

Maximum Marks : 35

S. No.	Chapter	Section-A (2 Marks)	Section-B (3 Marks)	Section-C (5 Marks)	Total
1.	Electrochemistry	–	–	1(5)	
2.	Chemical Kinetics	1(2)	1(3)*	–	**4(13)**
3.	Surface Chemistry	–	1(3)*	–	
4.	*d*- and *f*-Block Elements	–	1(3)*	–	
5.	Coordination Compounds	–	2(6)	–	**3(9)**
6.	Aldehydes, Ketones and Carboxylic Acids	2(4)	2(6)#	–	
7.	Amines	–	1(3)	–	**5(13)**
	Total Questions	**3(6)**	**8(24)**	**1(5)**	**12(35)**

*It is a choice based question.
#Out of the two questions only one question is choice based.

CHEMISTRY

Time allowed : 2 hours   *Maximum marks : 35*

General Instructions :

Read the following instructions carefully.

1. *There are 12 questions in this question paper with internal choice.*
2. *SECTION A - Q. No. 1 to 3 are very short answer questions carrying 2 marks each.*
3. *SECTION B - Q. No. 4 to 11 are short answer questions carrying 3 marks each.*
4. *SECTION C - Q. No. 12 is case based question carrying 5 marks.*
5. *All questions are compulsory.*
6. *Use of log tables and calculators is not allowed.*

SECTION - A

1. Give the simple chemical tests to distinguish between the following pairs of compounds (*any two*) :
   (a) Benzaldehyde and benzoic acid
   (b) Propanal and propanone
   (c) Benzaldehyde and acetophenone

2. Write the expression for the rate of reaction given below.
$$5Br^-_{(aq)} + BrO^-_{3(aq)} + 6H^+_{(aq)} \longrightarrow 3Br_{2(aq)} + 3H_2O_{(l)}$$

3. Name two reactions that can be used to increase number of carbon atoms in the chain of a carbonyl compound.

SECTION - B

4. Compare qualitatively the first and second ionisation potentials of copper and zinc. Explain the observation.

OR

How would you account for the following :
(a) Of the d^4 species Cr^{2+} is strongly reducing while manganese (III) is strongly oxidising.
(b) Cobalt (II) is stable in aqueous solution but in the presence of complexing reagents it is easily oxidised.
(c) The d^1 configuration is very unstable in ions.

5. The following results have been obtained during the kinetic studies of the reaction :
$$2A + B \rightarrow C + D$$
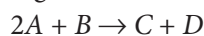
Experiment	$[A]$ / mol L^{-1}	$[B]$ / mol L^{-1}	Initial rate of formation of D/mol L^{-1} min^{-1}
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Determine the rate law and the rate constant for the reaction.

OR

While studying the decomposition of gaseous N_2O_5 it is observed that a plot of logarithm of its partial pressure versus time is linear. What kinetic parameters can be obtained from this observation?

6. Aqueous copper sulphate solution (blue in colour) gives:
   (a) a green precipitate with aqueous potassium fluoride and
   (b) a bright green solution with aqueous potassium chloride.
   Explain these experimental results.

7. How will you convert :
   (a) Ethanoic acid into methanamine?
   (b) Hexanenitrile into 1-aminopentane?
   (c) Methanol to ethanoic acid?

8. What is an adsorption isotherm? Describe Freundlich adsorption isotherm.

OR

Explain the cleaning action of soap. Why do soaps not work in hard water?

9. Write short notes on the following :
   (a) Ammonolysis
   (b) Gabriel pthalimide synthesis

10. Write the formulae of the following coordination compounds :
    (a) Tetraammineaquachloridocobalt (III) chloride.
    (b) Potassium tetrahydroxozincate (II).
    (c) Tetracabonylnickel (0).

11. Write structural formulae and names of four possible aldol condensation products from propanal and butanal. In each case, indicate which aldehyde acts as nucleophile and which as electrophile.

OR

An organic compound with the molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollens' reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1,2-benzenedicarboxylic acid. Identify the compound.

SECTION - C

12. Read the passage given below and answer the questions that follow.

    All chemical reactions involve interaction of atoms and molecules. A large number of atoms/molecules are present in a few gram of any chemical compound varying with their atomic/molecular masses. To handle such large number conveniently, the mole concept was introduced. All electrochemical cell reactions are also based on mole concept. For example, a 4.0 molar aqueous solution of NaCl is prepared and 500 mL of this solution is electrolysed. This leads to the evolution of chlorine gas at one of the electrode. The amount of products formed can be calculated by using mole concept.
    (a) Calculate the total number of moles of chlorine gas evolved.
    (b) Assuming Hg electrode as cathode, find out the maximum weight of amalgam formed by given solution.
    (c) What is the total charge (coulomb) required for complete electrolysis?
    (d) Find out the number of electrons involved in the complete electrolysis of NaCl.

OR

In electrolysis of NaCl, when Pt electrode is taken, then which gas is liberated at cathode?