

INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR

Spring (Mid) Semester 2012

Time : 2 hrs

Full Marks : 50

Prep Course
Department of Chemistry

Subject No. CY 00002

Subject Name : Preparatory Chemistry

1. How will you convert :

(a) Toluene to Benzylalcohol and p-Methyl benzoic acid ?

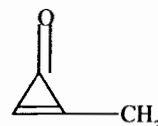
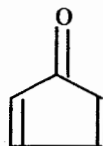
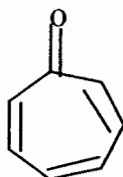
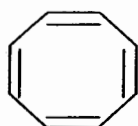
(b) Phenol to Picric acid and Salicylaldehyde ?

(c) Benzene to Acetophenone and Benzoic acid ?

(d) Benzene sulfonic acid to 1,3,5-trinitrobenzene ?

(2 X 4 = 8)

2. Which of the following molecules would you expect to show aromaticity ? Explain why ?
(2)



3. Give the complete definition of the following and write examples for each:

(2X4 = 8)

Ligand, Hard water, Adsorption indicator, Soap

4. Write a comparative account of the following ligands for binding bi-valent metal ion/ ions. Ligands are ammonia, hydrazine, EDTA and acetyl acetone.

(4 X 3 = 12)

5. (a) Differentiate between the followings: (i) Order and molecularity of a reaction (ii) Rate and rate constant of a reaction (iii) Average and instantaneous rate of a reaction and (iv) Threshold energy and activation energy.

(2 X 4 =8)

(b) What is meant by pseudomolecular reaction? Explain this by taking a suitable example.

(4)

6. (a) The half life period of a reaction for the decomposition of N_2O_5 is 5.7 hr. and is independent of the initial pressure of N_2O_5 . Calculate the (i) Specific rate constant and (ii) the time required to undergo to 90 % completion.

(2+3)

(b) The rate constant of a certain reaction n at $0^\circ C$ is $2.3 \times 10^{-3} \text{ lit mol}^{-1} \text{ sec}^{-1}$ and is $8.2 \times 10^{-2} \text{ lit mol}^{-1} \text{ sec}^{-1}$ at $15^\circ C$. What is the activation energy of the reaction?

(3)

Page-2 (End)