(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 7 Sub. Code : 1 1 7 0 8

Exam. Code : 5 0 1 1

Bachelor of Science (FYUP) 1st Semester

(2124)

CHEMISTRY

Paper : Chemistry CHMDSC1

Time Allowed : Three Hours] **[Maximum Marks : 60**

Note :— Attempt **FOUR** questions in all, selecting **ONE** question each from Units I-III, and Q.No. **1** is compulsory.

Compulsory Question

1. (a) Discuss Mulliken concept of electronegativity.

   (b) Write all four quantum numbers of 3d orbital.

   (c) Write two conditions for the geometrical isomerism.

   (d) What is homolytic and heterolytic fission ?

   (e) Integrate $\cos(4x + 1)dx$ w.r.t. x.

   (f) What do you mean by half-life of a reaction ? Write half-life of first order reaction. 2×6=12

UNIT—I

2. (a) Discuss principal and magnetic quantum numbers in detail.

   (b) Derive Schrodinger wave equation.

(c) What is ionization energy ? Discuss the variation of ionization energy down the group and along the period.

(d) What is effective nuclear charge ? Calculate effective nuclear charge for 3s-electron in Na atom. 4,4,4,4

3. (a) Draw and discuss radial probability curves for 3s and 3p.

(b) Write Aufbau principle. Give its two limitations.

(c) Give reasons for the following :

(i) Why electron affinity of F is less than Cl ?

(ii) Why Cl^- is larger than Cl ?

(d) What are isoelectronic ions ? Arranges the following in increasing order of their size O^{2-}, F^-, Na^+, Mg^{2+}. 4,4,4,4

UNIT—II

4. (a) What is hyperconjugation ? Explain the inductive effect of alkyl groups attached to benzene on the basis of hyperconjugation.

(b) What are carbanions ? Explain their structure and stability of carbanions.

(c) Draw the geometrical isomers of but-2-ene and 1, 2-dichloroethene.

(d) Explain the effect of torsional and steric strain on the stability of conformations. 4,4,4,4

5. (a) What do you mean by resonance and resonance effect ? How does it explain acidity of carboxylic acids ?

(b) Discuss the structure and stability of free radicals.

(c) Differentiate between E-Z and Cis-trans nomenclature with suitable examples.

(d) Draw chair and boat conformations of cyclohexane and explain their stability. 4,4,4,4

UNIT—III

6. (a) What is accuracy ? List various methods to improve the accuracy.

(b) Derive expression for kinetics for first order reaction.

(c) Discuss collision theory.

(d) Explain mechanism of heterogeneous catalysis. 4,4,4,4

7. (a) What are errors ? Discuss various types of errors briefly.

(b) What is law of mass action ? How does rate law differ from law of mass action ?

(c) Derive Arrhenius equation.

(d) Explain Michaelis Menten equation. 4,4,4,4