Seat No. _____

HAN-003-1013004

B. Sc. (Sem.-III) (CBCS)

(W.E.F. 2016) Examination

June - 2023

Chemistry : C-301

Faculty Code : 003

Subject Code : 1013004

Time : $2\frac{1}{2}$ Hours / Total Marks : **70**

Instructions : (1) Question paper carries total 5 questions.
(2) All the questions are compulsory & carry 14 marks each.

1 (a) Answer the following questions: **4**
(1) Who had given the principle of M.O. Theory?
(2) Provide de-Broglie's equation.
(3) What is the full form of BMO & ABMO.
(4) Give full form of LCAO.

(b) Answer in brief: (Any one out of two) **2**
(1) Write Schrodinger equation and explain its terms.
(2) Explain gerade and ungerade molecular orbitals.

(c) Answer in detail : (Any one out of two) **3**
(1) Explain Eigen function and Eigen value.
(2) Write short note on normalized and orthogonal wave functions.

(d) Write a note on: (Any one out of two) **5**
(1) Detive the co-efficients of wave function for sp^2 Hybridization.
(2) Explain the postulates of wave function.

2 (a) Answer the following questions: **4**

(1) Define : Lanthanide elements.

(2) Give the electronic configuration of Eu.

(3) Provide structure of Benzyne.

(4) Give structure of Biphenyl.

(b) Answer in brief: (Any one out of two) **2**

(1) Write a short note on Misch metal.

(2) Give synthesis of Chlorobenzene & Bromobenzene from Benzene via direct Halogenation.

(c) Answer in detail: (Any one out of two) **3**

(1) Provide the names and Symbols of Lanthanide elements.

(2) Explain Wurtz-Fittig reaction with example.

(d) Write a note on: (Any one out of two) **5**

(1) Describe lanthanide contraction in detail.

(2) Discuss relative reactivity of Alkyl halides Vs Allyl halides and Aryl halides.

3 (a) Answer the following questions: **4**

(1) Which product is obtained by reduction of Isonitrile ?

(2) What is 'Hinsberg reagent"?

(3) What is Epoxides?

(4) Provide structure of Picric acid.

(b) Answer in brief: (Any one out of two) **2**

(1) Provide sulphonation reactions for the Phenol.

(2) Give reduction methods for the preparation of amines.

(c) Answer in detail: (Any one out of two) **3**

(1) Explain Williamson ether synthesis.

(2) Write Hoffmann reaction with examples.

(d) Write a note on: (Any one out of two) **5**

(1) Explain preparation of 1^{o}, 2^{o}, 3^{o} alcohol using Grignard reagent.

(2) Explain preparation of Benzene diazonium chloride salt and its Azo coupling reaction.

4 (a) Answer the following questions: **4**

(1) How many phases are present in sulphur system ?

(2) How many phases are present in any solution ?

(3) Kolbe-Schmitt reaction is useful specially for carboxylation of which type of compounds?

(4) Define : eutectic point.

(b) Answer in brief: (Any one out of two) **2**

(1) Provide any two applications of Reimer-Tiemann reaction.

(2) Explain terms,: Phase and Component.

(c) Answer in detail: (Any one out of two) **3**

(1) Provide mechanism of Carbylamine reaction.

(2) Explain Gibb's phase rule and condensed phase rule.

(d) Write a note on: (Any one out of two) **5**

(1) Explain Pinacol-Pinacolone reaction with mechanism and application.

(2) Explain Phase diagram of water system..

5 (a) Answer the following questions: **4**

(1) Define : solution

(2) Define : Saturated solution.

(3) State Henry's law.?

(4) State Nernst distribution law.

(b) Answer in brief: (Any one out of two) **2**

(1) Provide any two applications of Nernst distribution law.

(2) What is the work of bubble cap in fractionating column?

(c) Answer in detail: (Any one out of two) **3**

(1) Explain the factors affecting the solubility.

(2) What are the conditions of validity for Nernst distribution, law?

(d) Write a note an: (Any one out of two) **5**

(1) State and describe Raoult's law.

(2) Provide distribution law statement, how it is modified when the solute associates in the solvent.
