



Seat No. _____

HAN-003-2013004

B. Sc. (Sem. III) (CBCS) (WEF-2019) Examination

June - 2023

Chemistry : C - 301

(New Course)

Faculty Code : 003

Subject Code : 2013004

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

- Instructions :**
- (1) There are five main questions.
 - (2) All questions carry equal marks.
 - (3) Figures to the right indicate marks.

- 1 (a) Answer the following questions : 4
- (1) Give full form of M.O.T.
 - (2) According to De-Broglie $\lambda =$ _____.
 - (3) NH_3 possess _____ hybridization.
 - (4) What is the difference between σ and σ^* molecule orbital?
- (b) Answer any **one** question : 2
- (1) Give difference between gerade and ungerade molecule orbitals.
 - (2) Explain normalized wave function.
- (c) Answer any **one** question : 3
- (1) Explain Eigen function and Eigen value.
 - (2) Explain potential energy and Schrodinger equation for H_2^+ .

- (d) Answer any **one** question : 5
- (1) What is hybridization? Derive value of coefficients for sp^2 hybridization.
 - (2) Describe the postulates of wave mechanics.
- 2 (a) Answer the following questions : 4
- (1) Give atomic number of Lutetium.
 - (2) Write only reaction : Bromo benzene from benzene.
 - (3) Write structure of Biphenyl.
 - (4) Write electronic configuration of Ce.
- (b) Answer any **one** question : 2
- (1) What is Misch-metal?
 - (2) Give one example of Ullmann reaction.
- (c) Answer any **one** question : 3
- (1) Explain Lanthanide contraction.
 - (2) Give chemical reactions of benzyne.
- (d) Answer any **one** question : 5
- (1) Write preparation of Aryl Halide by direct halogenation and from diazonium salts.
 - (2) Write a note on Ion-exchange method for isolation of Lanthanide elements.
- 3 (a) Answer the following questions : 4
- (1) Give IUPAC name of $CH_3 - O - CH_3$.
 - (2) Give structure of dimethyl amine.
 - (3) Write one example of 3° alcohol.
 - (4) Aniline is _____ amine.
- (b) Answer any **one** question : 2
- (1) Why aniline is less basic than methyl amine?
 - (2) Write reactions of ether with dil. H_2SO_4 and conc. H_2SO_4 .

- (c) Answer any **one** question : 3
- (1) Explain Hinsberg's test.
 - (2) Explain Lucas-test.
- (d) Answer any **one** question : 5
- (1) Explain sulphonation, nitration and bromination of phenol.
 - (2) Explain the chemical reactions of benzene diazonium chloride.
- 4 (a) Answer the following questions : 4
- (1) Define : Component.
 - (2) Vanilin can be synthesized by _____ reaction.
 - (3) Give structure of Allylphenyl ether.
 - (4) Define : Condensed phase rule.
- (b) Answer any **one** question : 2
- (1) Name the phase present in sulphur system.
 - (2) Short note on Kolbe-Schmitt reaction.
- (c) Answer any **one** question : 3
- (1) Give applications of phase-rule.
 - (2) Explain mechanism of Pinacol-Pinacolone rearrangement.
- (d) Answer any **one** question : 5
- (1) Discuss water-system with phase diagram.
 - (2) Write short note on Fries rearrangement.
- 5 (a) Answer the following questions : 4
- (1) Define : Azeotropic mixture.
 - (2) Name any two factors affects on Distribution Law.
 - (3) Define : Saturated solution.
 - (4) Define : Partition Coefficient.

- (b) Answer any **one** question : **2**
- (1) Explain ideal solution in short.
 - (2) Write Henry's law with equation.
- (c) Answer any **one** question : **3**
- (1) Explain thermodynamic derivation of Nernst distribution law.
 - (2) Explain the effects of pressure on solubility of gas.
- (d) Answer any **one** question : **5**
- (1) Discuss in detail "Steam Distillation".
 - (2) Explain solvent extraction in detail and derive equation for it.
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