



DCX-003-2013004

Seat No. _____

B. Sc. (Sem. III) (CBCS) (W.E.F. 2019) Examination

August - 2022

Chemistry : C-301

Faculty Code : 003

Subject Code : 2013004

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- 1 (a) Answer the following : 4
- (1) How many electrons and nuclei present in H_2^+ molecule ?
 - (2) Give condition for orthogonal Wave function.
 - (3) Give full name of LCAO
 - (4) Who had given principle of MOT?
- (b) Answer any **one** : 2
- (1) Define Eigen value And Eigen function.
 - (2) Explain potential energy and Schrödinger wave equation for H_2 molecule.
- (c) Answer any **one** : 3
- (1) Derive value of coefficient for sp hybridization.
 - (2) Give postulates of wave mechanics.
- (d) Answer any **one** : 5
- (1) Derive Schrödinger wave equation respect to space.
 - (2) Derive value of coefficient for Sp^2 hybridization.
- 2 (a) Answer the following : 4
- (1) Reaction of aryl halide with Mg metal forms reagent.
 - (2) In Ulmann reaction _____ metal is used as catalyst.
 - (3) The phenomenon of reducing atomic size of lanthanides from left to right in periodic table is known as _____
 - (4) Give electronic configuration of Gd.

- (b) Answer any **one** : **2**
- (1) Write a note on misch metal.
 - (2) Discuss relative reactivity of alkyl halides Vs Vinyl halides and aryl halides.
- (c) Answer any **one** : **3**
- (1) Explain lanthanides contraction.
 - (2) Discuss Benzyne mechanism in detail.
- (d) Answer any **one** : **5**
- (1) Explain Ion - exchange method and Solvent Extraction method for Isolation of lanthanide.
 - (2) Discuss the following reactions in detail :
 - (a) Wurtz reaction
 - (b) Wurtz Fittig reaction
- 3** (a) Answer the following : **4**
- (1) Reaction of aniline with nitrating mixture gives _____
 - (2) Write the structure of trimethylamine.
 - (3) Give reaction of hydrolysis of methyl cyanide.
 - (4) Give reaction methyl bromide with AgCN.
- (b) Answer any **one** : **2**
- (1) Explain Lucas test.
 - (2) Give reduction of Nitro compounds.
- (c) Answer any **one** : **3**
- (1) Write reaction of phenol: nitration, halogenation and sulphonation.
 - (2) Explain any three methods to prepare primary amine.
- (d) Answer any **one** : **5**
- (1) Discuss Heinsberg's method to differentiate primary, secondary and tertiary amine.
 - (2) Explain reaction of epoxide with alcohol, ammonia and lithium aluminum hydride.

- 4 (a) Answer the following : 4
- (1) Which intermediate is formed in Reimer-Tiemann reaction.
 - (2) Write only equation formation of carbylamine from primary amine.
 - (3) Define condensed phase rule.
 - (4) To which type of system Phase rule is applicable.
- (b) Answer any **one** : 2
- (1) Write the mechanism of Claisen rearrangement.
 - (2) Define Eutectic point with the help of diagram.
- (c) Answer any **one** : 3
- (1) Explain one component Water system with neat diagram.
 - (2) Write a note on: Kolbe Schmitt Reaction.
- (d) Answer any **one** : 5
- (1) Explain Congruent melting point with an example and neat diagram.
 - (2) Explain principle, mechanism and application of Pinacol-Pinacolone rearrangement.
- 5 (a) Answer the following : 4
- (1) If the quantity of solute is more than saturation value, it is called _____ solution.
 - (2) Define Saturated solution.
 - (3) The lever rule is a formula used to determine the _____.
 - (4) Define Nernst Distribution Law.
- (b) Answer any **one** : 2
- (1) Explain Dissociation of the solute in one of the solvents.
 - (2) Mention the factors affecting solubility.

(c) Answer any **one** : **3**

- (1) Derive Nernst Distribution Law thermodynamically.
- (2) Explain the effect of pressure on solubility of a gas.

(d) Answer any **one** : **5**

- (1) Mention the applications of Nernst Distribution Law.
 - (2) Discuss steam distillation in detail.
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