



DL-003-001404

Seat No. _____

B. Sc. (Sem. IV) Examination

March - 2022

Chemistry : C-401

(Old Course)

Faculty Code : 003

Subject Code : 001404

Time : **2.30** Hours]

[Total Marks : **70**

- Instruction :**
- (1) Q-1 is very short answer type carries 1 mark each. All are compulsory.
 - (2) Q-2 & 3 carries 25 marks with internal option.

1 Write the answer in short as required. **20**

- (1) What is Ψ_{mo} for H_2^+ according to LCAO ?
- (2) Based on MOT the normalised wave function for H_2^+ will be _____.
- (3) $\int \Psi_i \Psi_j \partial T = 0$ is true or false for Orthogonality. _____.
- (4) What type of molecule is Ferrocene ?
- (5) Give name of wittigs reagent ?
- (6) What is Physical stage of staggered Ferrocene ?
- (7) Pyrolidine, Thiolane, Furan are _____ heteroatoms.
- (8) Pyrole is highly basic heteroatom of all. Ture/False
- (9) What is Resonance energy value of pyrole ?
- (10) Who assigned keto structure first ?
- (11) What is symbol used for tautomerism & resonance ?

- (12) Give the unit for Rate constant 'K' for third order reaction ?
- (13) Give the example of third order reaction.
- (14) Which type of graph is obtained in $\ln [A]$ versus time in first order reaction ?
- (15) Give few examples of Aerosol.
- (16) What is cata phoresis ?
- (17) What component is required in neutral refractories ?
- (18) What is PCE value for Super Duty refractory ?
- (19) Give formula of Ziegler Natta Catalyst.
- (20) Give examples for thermosett polymer.

2 Answer the following as per instructions.

(A) Answer any 3 of the questions.

6

- (1) Derive the wave function of H_2^+ ion.
- (2) Write Schrodingers Equation for H_2^+ ion.
- (3) Classify following organometallic compounds
 - (1) $(C_2H_5)_2S$ (2) $(CH_2C_6H_5)Na$
 - (3) Ferrocene (4) $(C_2H_5)_2Zn$
- (4) Give structures of the following.
 - (a) Isoxazole (b) Pyridazine
 - (c) Thiazole (d) Crotonic acid
- (5) Give structure of (1) Methyl Uracil (2) Crotonic acid
- (6) Arrange order of reactivity.
Benzene, Furan, Thiophene, Pyrrole

(B) Answer any three. 9

- (1) Give rules for wave function construction of hybrid orbitals.
- (2) Give preparation of Ferrocene.
- (3) Give preparation of zeise salt.
- (4) Give paal knorr synthesis of Thiophene.
- (5) Differentiale Tautomerism and Resonance.
- (6) Give synthesis of valeric acid from Malonic acid.

(C) Answer any two. 10

- (1) Derive wave functional for SP^2 hybridorbital.
- (2) Explain structure of Ferrocene.
- (3) Give Synthesis and chemical Properties of Pyridive.
- (4) Give Synthesis and Mechanism of Crotonicacid from EAA.
- (5) Explain reactivity of active methyleve compounds.

3 Answer the following as per instructions.

(A) Answer any three of the following questions : 6

- (1) Define the Molecularity of the reaction.
- (2) What is Zero Order Reaction ?
- (3) What is dispersed phase and dispersion medium.
- (4) Define glazing and give different components used in it.
- (5) Give six major steps for manufacturing of ceramics.
- (6) What is Thermo Sett Polymer give example of it.

(B) Answer any three of the following questions.

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- (1) Derive the rate constant equation for second order reaction with different concentration.
- (2) A gaseous reactant with concentration of 4×10^{-2} mole/litre takes 40 minutes for its 40% decomposition. Calculate specific reaction rate for second order reaction.
- (3) Explain different dispersion method for the preparation of colloidal solution.
- (4) Classify refractories with example and give its characteristics.
- (5) Classify polymerization based upon its structure.
- (6) What is Ziegler Natta polymerization reaction ? Give example of it.

(C) Answer any two of the following questions.

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- (1) Explain collision theory for bimolecular reaction and the reason for its failure.
- (2) Explain Optical and the electrical properties of the colloidal solution.
- (3) Discuss any 5 properties of the refractory bricks.
- (4) What is thermosett polymer give synthesis of one of the thermosett polymer ?
- (5) Explain addition polymerization and related mechanism in depth.