



MAZ-003-001404

Seat No. \_\_\_\_\_

**B. Sc. (Sem. IV) (CBCS) Examination**

**March / April - 2018**

**Chemistry : C - 401**

*(Old Course)*

**Faculty Code : 003**


**Subject Code : 001404**

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

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.  
(2) Q-2 and Q-3 have internal options.  
(3) Figures given in the right side are total marks of that question.

1 Answer the following questions : 20

- (1) According to LCAO what is the wave function for  $H_2^+$ ?
- (2) What will be the contribution of 'S' orbital if there are 'n' hybrid orbitals in a set ?
- (3) Define organometallic compounds.
- (4) Complete the reaction;  $C_2H_5Li \xrightarrow{\Delta} \underline{\quad ? \quad}$ .
- (5) Write Schrodinger equation with Laplacian operator.
- (6) Draw structures of Pyrrole and Pyridine showing  $\alpha$  and  $\beta$  - carbon in the ring.
- (7) Give the decreasing order of aromaticity of thiophene and furan compared to benzene.
- (8) Complete the reaction;   $\xrightarrow[300^\circ C]{KNO_3 + Conc.H_2SO_4}$        ?
- (9) Give all functional groups present in EAA.
- (10) Give IUPAC name of Ethyl Aceto Acetate.
- (11) What is zero order reaction ?
- (12) Define, "Order of a reaction".
- (13) Give particle size of colloidal solution.
- (14) Give two examples of gas-liquid colloidal system.
- (15) Name the methods used for purification of colloidal sol.
- (16) What is the use of fluxing agents in ceramics.

- (17) Name raw materials used for making ceramics.
- (18) Give name of main types of refractories.
- (19) Give classification of polymers based in inter molecular interaction.
- (20) What is meant by thermoplastics ?

- 2 (a) Answer any **three** of the following : **6**
- (1) Why furan is the least aromatic ?
  - (2) Give any two reduction reaction of pyridine.
  - (3) Give preparation reaction to form 4-methyl Uracil from EAA.
  - (4) Give any two preparation reaction for Organo Aluminium compounds.
  - (5) What is LCAO ? Define it.
  - (6) What is the contribution of 's' orbital towards a wave function of sp hybrid orbitals ?
- (b) Answer any **three** of the following : **9**
- (1) Prove that the sum of square of coefficient of each component atomic orbital in a wave function is unit.
  - (2) Derive  $\phi_{M_0}$  for  $H_2^+$  by LCAO method.
  - (3) Explain reaction of  $\alpha$ -alkyl aceto acetate with  $HNO_2$  to form oximino compounds.
  - (4) Give nitration of pyrrole, furan and thiophene.
  - (5) Define sandwich type organometallic compounds with example.
  - (6) Give industrial method for the preparation of ethyl aceto acetate.
- (c) Answer any **two** of the following : **10**
- (1) Discuss the structure of zeise salt.
  - (2) Derive the coefficients of wave functions of  $Sp^2$  hybrid orbitals.
  - (3) Give any three synthesis and chemical properties of pyrrole.
  - (4) Discuss about the reactivity of active methylene compounds.
  - (5) Derive Schrodinger equation with potential energy for  $H_2$  molecule.

- 3 (a) Answer any **three** of the following : 6
- (1) Explain energy of activation.
  - (2) Give hydrolysis method for colloidal sol preparation.
  - (3) Which methods are used to apply colours to the pottery ?
  - (4) What is meant by basic refractories ?
  - (5) Define natural and synthetic polymers.
  - (6) Explain linear polymers.
- (b) Answer any **three** of the following : 9
- (1) Give reasons for failure of collision theory.
  - (2) Describe classification of polymers based on structure.
  - (3) List the characteristics of good refractories.
  - (4) Explain, "Tyndall Effect".
  - (5) Why inversion of sucrose in presence of dilute HCl is called pseudo first order reaction ?
  - (6) Determine the unit of rate constant for third order reaction.
- (c) Answer any **two** of the following : 10
- (1) Derive equation of rate constant for the first order reaction and explain half life period.
  - (2) Discuss about the application of colloids.
  - (3) List the methods used to derive the order of reaction and describe graphical method.
  - (4) Discuss in detail; the grinding, mixing and body preparation of ceramics.
  - (5) Write a note on cationic and anionic addition polymerization.
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