



**AP-21038**

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

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

**March / April – 2016**

**C-401 : Chemistry**

Time : 3 Hours]

[Total Marks : 75

- Instructions :** (1) This question paper contains three questions of 25 marks each. All the questions are compulsory.  
(2) Each question is divided into (a), (b), (c) and (d).

**I (a) Answer any five of the following : 5**

- (1) What is sp hybridization?
- (2) State the function of filler in fertilizers
- (3) What is a mixed fertilizer?
- (4) What is molecular orbital theory?
- (5) Give an example of nitrogenous fertilizer
- (6) Give two uses of organo lithium
- (7) Give the structural formula of trimethyl aluminium (dimer)

**(b) Answer any three of the following : 6**

- (1) Give one preparation of organolithium compound.
- (2) What are Zeise salts? Give its preparation
- (3) Write the chemical reaction for the preparation of ferrocene.
- (4) Give the demerits of natural fertilizers
- (5) Derive wave function of  $H_2^+$  on the basis of molecular orbital theory.

- (c) Answer any three of the following : 9
- (1) Discuss the molecular orbital energy level diagram of  $\text{BeCl}_2$ .
  - (2) Give synthesis of different types of fertilizers from naphtha.
  - (3) Give a comparison between natural and synthetic fertilizers.
  - (4) Give the industrial production of DAP.
  - (5) Explain the structure of ferrocene.
- (d) Answer any one of the following : 5
- (1) Give the classification of organometallic compounds based on type of M-C bond.
  - (2) Give the synthesis of phosphate and potassium fertilizers.
- 2 (a) Answer any five of the following : 5
- (1) Name the product formed when isoquinoline reacts with  $\text{H}_2\text{SO}_4$ .
  - (2) What are heterocyclic compounds?
  - (3) Give the name of.  $\text{CH}_3\text{--CO--CH}_2\text{--COO--CH}_2\text{CH}_3$ .
  - (4) Give the structure of diethylmalonate.
  - (5) Give the synthesis of thiophene from butane.
  - (6) Write the structure of furan and Pyrrole.
  - (7) What are optical isomers ?
- (b) Answer any three of the following : 6
- (1) Give the conversion of pyrrole to pyrrole 2-carboxylic acid
  - (2) Give any two methods of synthesis of thiophene.
  - (3) Give the synthesis of butyric acid from ethylacetoacetate
  - (4) Give the synthesis of succinic acid from diethylmalonate.
  - (5) Give the different isomers of ethane.

- (c) Answer any three of the following : 9
- (1) Give Diels- Alder reaction of furan.
  - (2) Give evidence for the keto structure of ethylacetoacetate.
  - (3) Explain pyridine is more basic than pyrrole.
  - (4) Give the reaction of pyridine with  $\text{NaNH}_2$ ,  $\text{NaOH}$  and  $\text{C}_6\text{H}_5\text{Li}$ .
  - (5) Write the sequence rules for RS nomenclature.
- (d) Answer any one of the following : 5
- (1) Explain with reaction mechanism synthesis of ethylacetoacetate.
  - (2) Explain geometrical isomerism.
- 3 (a) Answer any five of the following : 5
- (1) Define electrode.
  - (2) Define order of reaction.
  - (3) Define electrochemical cell.
  - (4) What is nucleon?
  - (5) Explain radioactive decay.
  - (6) Give the kinetic equation for rate constant of first order reaction.
  - (7) What is molecularity of reaction?
- (b) Answer any three of the following : 6
- (1) Explain salt bridge.
  - (2) Write the cell reaction of the following cell:  
 $\text{Zn}/\text{Zn}^{2+}(1\text{M})//\text{Cu}^{2+}(1\text{M})/\text{Cu}$ .
  - (3) Give any two names of experimental methods of chemical kinetics.
  - (4) In a second order reaction in 500 sec 20% of the reaction is complete. Find out the time required when 60% of the reaction is over.
  - (5) Give the properties of gamma ( $\gamma$ ) particles.

(c) Answer any three of the following : 9

- (1) Explain radioactive disintegration law.
- (2) Derive the equation  $t_{1/2} = 0.693 / k$ .
- (3) Derive Arrhenius equation.
- (4) Write merits and demerits of  $H_2$  electrode.

(d) Answer any one of the following : 5

- (1) Describe Quinhydrone electrode with merits and demerits.
- (2) What are the different methods for determining order of reaction? Explain any two methods.

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