



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 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 H_2SO_4 .
- (2) What are heterocyclic compounds?
- (3) Give the name of $\text{CH}_3\text{COCH}_2\text{COOCH}_2\text{CH}_3$.
- (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 ethylacetacetate
- (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 react ion of pyridine with NaNH_2 , 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:
 $\text{Zn/Zn}^{2+}(1\text{M})/\text{Cu}^{2+}(1\text{M})/\text{Cu}$.
- (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 (γ) 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.
