M.Sc. II - Sem. IV - Oct. 2016
Organic Chemistry - paper IV

QP Code : 76845

(2½ Hours) [Total Marks : 60

N.B. : (1) All questions are compulsory.
(2) Figures to the right indicate maximum marks

1 (a) Answer any two of the following: 8
(i) Why are drugs converted into prodrugs? Give the types and ideal properties of prodrugs.
(ii) Explain 'QSAR' and discuss how the Taft equation helps to predict the effect of steric factors on the biological activity of a drug.
(iii) How is the 'Computer-aided molecular graphics' used for drug design? What are its advantages and limitations?
(iv) Explain the studies carried out by Hansch for quantifying the relationship of structure to the activity of the drug. Give the two forms of modified Hansch equations.

(b) Answer any one of the following: 4
(i) Give the synthesis and one application of each of the following:
(I) Oxyphenbutazone (II) Fenofibrate
(ii) Give the synthesis and one application of each of the following:
(I) Methotrexate (II) Diclofenac

2. (a) Answer any one of the following: 8
(i) Starting from enolic intermediate explain the role of lipoic acid in the conversion of coenzyme A to acetyl coenzyme A.
(ii) Write a note on biomodelling giving any one example.
(iii) Give the plausible mechanism for the conversion of methyl malonyl coenzyme A to succinyl coenzyme A brought about by coenzyme B_{12} dependent enzyme.
(iv) Match the following coenzymes with their metabolic functions/ structural features.

I) NAD	A) Isoalloxazine ring
II) Pyridoxal phosphate	B) Carrier of CO_2
III) Biotin	C) Niacin
IV) FAD	D) Racemisation

(b) Answer any one of the following: 4

(i) Give the mechanism of conversion of pyruvate to acetolactate by acetolactate synthase which requires thiamine pyrophosphate as a coenzyme.

(ii) Give the name and the structure of the coenzyme involved in the following enzymatic biochemical transformations.

I) Tryptophan to serotonin

II) Acetyl coenzyme A to malonyl coenzyme A

3. (a) Answer any two of the following: 8

(i) Write a note on production of vitamins by fermentation.

(ii) Give any two examples of each of the following enzyme catalyzed reactions.

I) Hydroxylation

II) Reduction

(iii) Giving examples illustrate how microbial transformation is used in organic synthesis.

(iv) How are enzymes immobilised by cross linking? What are the advantages of immobilzation of enzymes.

(b) Answer any one of the following: 4

(i) Write a note on production of 6-aminopenicillanic acid using an enzyme in immobilzed form.

(ii) Explain the structural features of glycogen.
Explain the role of phosphoglucomutase in glycogen breakdown.

4. Answer any one of the following: 8

(i) What is the importance of 'ultra sound' in green synthesis? What are the required conditions, for the use of ultra-sound in green synthesis? Explain how Cannizzaro reaction is carried out under sonication.

(ii) With reference to green chemistry write notes on :

I. Ionic Liquids

II. Solid supported green synthesis.

(iii) Name and give the structure of any two green solvents. Give their green advantages. How is Diels-Alder reaction carried out, using water as a solvent?

(iv) Justify how do the following contribute to green synthesis.

I. Super critical carbon dioxide

II. Green oxidation catalysts.

(b) Answer any one of the following: 4

(i) For the synthesis of para aminodiphenylamine, compare the conventional method of synthesis with the green method.

(ii) Give the traditional process and the green process for the synthesis of adipic acid and give the advantages of the green process.

. Answer any one of the following: 12

(a) Write a note on the concept of 'Soft drugs' What are the properties of soft drugs?

(b) Give the synthesis and one application of labetalol.

(c) Explain the stereospecificity observed in the oxidation of an alcohol by alcohol dehydrogenase which uses NAD^+ as a coenzyme.

(d) Show how an amino acid is converted to a keto acid by pyridoxal phosphate.

(e) Giving examples show how chiral hydroxy acids are prepared by enzymatic processes.

(f) Name the enzymes involved in glycogen synthesis.

(g) What is it important to avoid 'waste', from a green perspective? Give two reactions that have 100% atom economy.

(h) Write a note on green reagents.
