

MSc II - Sem. II - Oct. 2016.

Organic Chem - Paper IV

QP Code : 77895

(2½ Hours)

[Total Marks : 60

- N.B. : (1) All questions are compulsory.
(2) Numbers to the right indicate full marks.

1. (a) Answer any two of the following:-
- (i) Explain: (A) Drug assay (B) Bioavailability.
 - (ii) Discuss the pharmacokinetics in drug distribution and metabolism.
 - (iii) Show how structure activity relationship studies are important for lead modification?
 - (iv) Explain physical and chemical parameters like solubility and ionization in drug distribution and drug receptor binding.
- (b) Answer any one of the following:- 4
- (i) Discuss how penicillin was discovered with a lead.
 - (ii) Discuss 'bioisosterism' in detail.
2. (a) Answer any two of the following:- 8
- (i) Discuss the secondary structure of proteins.
 - (ii) Explain the process of replication of DNA.
 - (iii) How does DNA control protein synthesis in the body?
 - (iv) Discuss the synthesis of oligonucleotides by using phosphoramidite method.
- (b) Answer any one of the following:- 4
- (i) Give the synthesis of oligonucleotides by H-phosphonate method. What are its advantages?
 - (ii) Discuss the chemical and Enzymatic hydrolysis of proteins to peptides.
3. (a) Answer any two of the following:- 8
- (i) Name the major class of enzyme involved in the following biochemical transformations:
I. $\text{Glucose} + \text{ATP} \rightarrow \text{Glucose-6-Phosphate} + \text{ADP} + \text{H}^+$
II. $\text{R}-\underset{\text{NH}_2}{\text{CH}}-\text{CONH}-\underset{\text{R}^1}{\text{CH}}-\text{COOH} \rightarrow \text{R}-\underset{\text{NH}_2}{\text{CH}}-\text{COOH} + \text{H}_2\text{N}-\underset{\text{R}^1}{\text{CH}}-\text{COOH}$

Explain the effect of pH on enzyme catalysis.

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- (ii) What is "active site" in an enzyme? Enumerate its characteristics.
- (iii) Discuss the specificity of enzymes.
- (iv) Explain reversible inhibition and non-competitive inhibition of an enzyme with a suitable example.

(b) Answer any **one** of the following:-

- (i) How does substrate concentration affect the rate of an enzyme catalysed reaction? Define Michaelis Constant and give its significance.
- (ii) What is the biochemical function of chymotrypsin? Explain the role played by amino acid residues Ser 195 and His 57 in the mechanism of action of chymotrypsin.

4. (a) Answer any **two** of the following:-

- (i) Give the biosynthesis of shikimic acid.
- (ii) Explain one cycle in the biosynthesis of fatty acids.
- (iii) Give the biosynthesis of Anthranilate from shikimate.
- (iv) Discuss the general principles involved in the biosynthesis of alkaloids.

(b) Answer any **one** of the following:-

- (i) Starting from cinnamyl coenzyme A give the biosynthesis of ephedrine.
- (ii) Show how squalene is converted to lanosterol. Explain the steps involved.

5. Answer any **four** of the following:-

- (a) Explain how homologation and chain branching affect the potency of the drug.
- (b) Discuss the role of isomerism in drug distribution.
- (c) Discuss the secondary structure of RNA.
- (d) Give the structure and importance of ATP.
- (e) Explain the effect of temperature on enzyme catalysed reaction.
- (f) With respect to enzyme action explain "covalent catalysis".
- (g) What are biological equivalents of isoprene? How are they biosynthesized from 3R-Mevalonic acid.
- (h) Explain the terms: (I) Biogenesis (II) Primary metabolites.