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Sr. No. of Question Paper : 2326

F-4

Your Roll No.....

Unique Paper Code : 2491403

Name of the Course : B.Sc. (Hons)/Biochemistry

Name of the Paper : Metabolism of Amino Acids and Nucleotides

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions in all.
3. Question No. 1 which is compulsory.

1. (a) Justify the following statements:

- (i) Patients of phenylketonuria are advised not to take artificial sweeteners.
- (ii) Leucine is a purely ketogenic acid
- (iii) L-asparaginase is an effective chemotherapeutic agent.
- (iv) Branch Chain Keto Dehydrogenase closely resembles Pyruvate Dehydrogenase.
- (v) Deficiency of folic acid leads to increased mutagenesis leading to proneness to cancer.
- (vi) Kwashiorkor leads to depigmentation of skin and hair.
- (vii) There is an increase in glutamine processing by kidney during metabolic acidosis.
- (viii) Serine is synthesized from glycolytic intermediates.

P.T.O.

- (b) Branched chain amino acid metabolism is affected by biotin and vitamin B₁₂ deficiency. (16,3)
2. (a) What are the different ways by which glycine can be broken down?
(b) Describe the key steps of urea cycle along with their subcellular localization.
(c) Write four reactions that utilize phosphoribosyl pyrophosphate (PRPP) as substrate. (4,6,4)
3. (a) Differentiate between:
(i) Acute intermittent and erythropoietic porphyria
(ii) *De novo* and salvage pathways of nucleotide biosynthesis
(iii) Transamination & oxidative deamination
(b) Tryptophan is a precursor for the biosynthesis of a variety of biomolecules. Name any two compounds derived from tryptophan (4,4,4,2)
4. (a) How are purine nucleotides catabolized to uric acid?
(b) Explain three criteria to assess the protein quality for nutrition.
(c) Give three examples from amino acid metabolism where PLP acts as a coenzyme.
(d) Why do patients with Lesch-Nyhan syndrome suffer from severe Gout? (6,3,3,2)
5. (a) Arginine and proline converge at the same molecule. Write down the steps and enzymes involved in the complete degradation of this molecule.
(b) Discuss the regulation of heme biosynthesis.
(c) Write down the steps to accomplish the following conversions:

- (i) Guanine to uric acid
 - (ii) Succinyl CoA to porphobilinogen
 - (iii) Tyrosine to Epinephrine (4,4,2,2,2)
6. (a) Give an example each of a reaction requiring the following coenzyme/cofactor:
- (i) N⁵N¹⁰ methylene tetrahydrofolate
 - (ii) N¹⁰-Formyltetrahydrofolate
 - (iii) Molybdopterin
- (b) Indicate the role of creatine in energy shuttle.
- (c) Describe the structure and regulation of the ribonucleotide reductase (3,3,8)
7. (a) Give the mode of action of the following inhibitors and their use in medicine: (any three):
- (i) 5 Fluorouracil
 - (ii) Allopurinol
 - (iii) 6-mercaptopurine
 - (iv) Methotrexate
- (b) Name the defective enzyme(s) and the symptoms associated with the following disorders:
- (i) Alkaptonuria
 - (ii) Severe combined Immunodeficiency
 - (iii) Maple syrup urine disease
 - (iv) Hartnup disease (6,8)

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8. Write short notes on:

(i) γ - glutamyl cycle

(ii) Krebs' bicycle

(iii) Glucose Alanine cycle

(iv) Biosynthesis of coenzyme A

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