[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1041 **E** **Your Roll No.....**

Unique Paper Code : 249403

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

Name of the Paper : Metabolism of Aminoacids & Nucleotides [BCHT-407]

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.
4. Use of scientific calculator/log tables may be allowed.

1. (a) Indicate whether each of the following statements (any six) is true or false. Justify your answer:

   (i) Isoleucine is a purely ketogenic aminoacid.

   (ii) Deficiency of essential aminoacids in the diet leads to negative nitrogen balance

   (iii) Serine cannot be synthesized by glycolytic intermediates.

   (iv) D-aminoacids are not present in the mammalian proteins but are regularly taken in the diet and metabolized by the body.

   (v) THE is a better Cl transfer unit than any other methylating agents.

   (vi) Methotrexate and Trimethoprim is the drug of choice in treating human microbial infections.

   (vii) Bacterial CPS is partially inhibited by UMP.

(b) Give one significant contribution of the following scientists:

(i) John Buchanan

(ii) Mary Ellen Jones

(iii) Hans Krebs and Henseleit

(iv) Irwin Rose (15,4)

2. (a) Differentiate between the following pairs (any 3):

(i) Denovo synthesis of purine and pyrimidine nucleotides

(ii) Gluconeogenic and Ketogenic Aminoacids

(iii) Carbamoyl phosphate synthetase I and II

(iv) Positive and Negative Nitrogen Balance

(b) Why nitrogen fixing bacterial cells expresses very high level of the enzyme nitrogenase ? (12,2)

3. Explain the following:

(a) Detailed regulation of de novo purine nucleotide synthesis.

(b) Phenylketonuria resulting from dihydropteridine reductase deficiency is a more serious disorder than phenylketonuria resulting from phenylalanine hydroxylase deficiency.

(c) Write the action of the following inhibitors:

(i) Azaserine

(ii) Allopurinol

(iii) 5-fluorouracil (5,3,6)

4. (a) Describe the role of Tetrahydrofolate (THF) and Pyridoxal phosphate in the metabolism of nucleotides and amino acids respectively.

(b) Explain Urea Cycle and also discuss its physiological importance. (7,7)

5. (a) Give the following conversions (any **five**):

(i) dUMP to dTMP

(ii) Phenylalanine to Epinephrine

(iii) Arginine to Creatine

(iv) L-ornithine to spermidine

(v) Homocysteine to methionine

(vi) IMP to GMP

(b) Describe the role of Ribonucleotide Reductase in *E. coli*. (10,4)

6. (a) Name the defective enzyme, biochemical features and the clinical symptoms associated with the following metabolic disorders (any **three**):

(i) Lesch Nyhan Syndrome

(ii) Maple syrup urine disease

(iii) Homocysteinuria

(iv) Alkaptonuria

(b) Explain - Sulfonamides are used as antibacterial agents. (12,2)

7. (a) What is nitrogen fixation? Explain how inorganic nitrogen from the biosphere is assimilated into biomolecules.

(b) What is deamination? Indicate four ways by which amino acid undergo deamination.

(c) Name the chief excretory product of purine nucleotides catabolism in the following —

(i) Bony fishes

(ii) Marine invertebrates

(iii) Birds and Reptiles. (6,5,3)

8. (a) Write short notes on (any **four**):

(i) Activated methyl cycle

(ii) Salvage pathways of nucleotide synthesis

(iii) Krebs bicycle

(iv) Gamma glutamyl cycle

(v) Glucose Alanine cycle

(b) Compare the enzymatic reactions that release ammonia from amine and amide groups of glutamine. (12,2)

(100)