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994

Your Roll No.

B.Sc. (Hons.) / II

C

BIOCHEMISTRY – Paper X

(Metabolism of Amino Acids, Nucleotides
and Porphyrins)

(Admissions of 2000 and onwards)

Time : 3 Hours

Maximum Marks : 60

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt Five questions in all, including
Question No. 1 which is compulsory.*

1. (a) Explain the following:

- (i) Persons on high protein diet are advised to drink lots of water.
- (ii) Mature RBCs are unable to synthesize heme
- (iii) Children suffering from Kwashiorkor show depigmentation of skin and hair.
- (iv) Nitrogen fixation is energetically costly.
- (v) Deoxyadenosine is toxic to mammalian cells.

(10)

P.T.O.

(b) Name the following :

- (i) The amino acid formed from serine and is key building block in biosynthesis of heme.
- (ii) The compound which links urea cycle with TCA cycle.
- (iii) The multifunctional enzyme of pyrimidine biosynthesis.
- (iv) Analogue of hypoxanthine used in treatment of gout (in which nitrogen and carbon atoms at 7th and 8th position are interchanged)
- (v) Enzyme deficient in alkaptonuria.
- (vi) Enzyme involved in salvage pathway. (6)

2. (a) Compare the following :

- (i) Carbamoyl phosphate synthetase I and II
- (ii) Oxidative deamination and transamination.
- (iii) Erythropoietic porphyria and intermittent acute porphyria. (6)

(b) Explain the regulation of heme biosynthesis. (5)

3. (a) Write short notes on any two :

- (i) Glucose alanine cycle
- (ii) Urea cycle

- (iii) γ Glutamine cycle for transport of amino acid
- (iv) Purine nucleotide cycle (8)
- (b) Give one example of reaction requiring following coenzyme/cofactor :
- (i) Molybdenum
- (ii) $N^5 N^{10}$ methylene tetrahydrofolate (2)
- (c) Draw the purine ring indicating donor molecules. (1)
4. (a) Write the scientific contribution of the following :
- (i) John Buchanan and Robert Greenberg
- (ii) David Shemin
- (iii) Hans Krebs and Kurt Hansleit (3)
- (b) Give the biochemical basis of following disorders and name the defective enzyme
- (i) Orotic aciduria
- (ii) Severe combined immuno deficiency (SCID)
- (iii) Maple syrup urine disease
- (iv) Lesch Nyhan syndrome (8)
5. (a) Write the mode of action of following (any **four**) :
- (i) Azaserine
- (ii) Trimethoprim

- (iii) Hydroxy urea
- (iv) 5-Fluorouracil
- (v) PALA (8)
- (b) Why is the catabolism of isoleucine said to be both glucogenic and ketogenic? (3)
6. (a) Discuss the *de novo* synthesis of pyrimidine nucleotides and its regulation. (6)
- (b) Write short note on nitrogen balance. (5)
7. (a) Explain biosynthesis of spermidine. (3)
- (b) Write the conversion of glutamate to glutamine. (3)
- (c) S-adenosyl methionine serves as a methyl group donor in many reactions. Explain. Give two examples. (5)
8. Explain the following :-
- (i) Regulation of carbamoyl phosphate synthetase for urea cycle.
- (ii) Regulation of Ribonucleotide reductase.
- (iii) Sulfonamide drugs do not interfere with human purine nucleotide biosynthesis. (4,4,3)