

**2021**

**BIOCHEMISTRY — HONOURS**

**Paper : CC - 9**

**Full Marks : 50**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

1. Answer **any five** questions : 2×5
- (a) What is phenylketonuria?
  - (b) Write the name of enzyme and cofactor present in oxidative deamination.
  - (c) Antifolates are anticancer drugs. State their mode of action.
  - (d) What are the precursors of urea produced by urea cycle?
  - (e) Write down the cause of gout. How can it be treated?
  - (f) What is the significance of glucose-alanine cycle?
  - (g) Which amino acid is the precursor of GABA and how is it produced?
  - (h) Explain with one example, how amino acid metabolism is linked to TCA cycle.
  - (i) What is one carbon metabolism? Give an example.
  - (j) Name one coenzyme nucleotide and write its precursor molecule.
2. Answer **any two** questions :
- (a) Show the biosynthetic origins of pyrimidine ring atoms. Pyridoxal phosphate is essential for amino acid metabolism.— Explain the statement with specific reaction involved. 2+3
  - (b) Differentiate the functions of carbamoyl phosphate synthase I and carbamoyl phosphate synthase II. Explain the regulation of carbamoyl phosphate synthetase I. 3+2
  - (c) Methotrexate blocks reduction of dihydrofolate.— Explain. What is the cause of Lesch-Nyhan syndrome? 3+2
  - (d) Heme biosynthesis is related to the TCA cycle intermediate.— Explain the statement. What is bilirubin? Write its precursor. 3+2

Answer **any three** questions.

3. (a) Regulation of pyrimidine nucleotide biosynthesis in bacteria and in animals are different.—State true or false with proper explanation.
- (b) Differentiate between glucogenic and ketogenic amino acids with example.

**Please Turn Over**

- (c) Mentioning the precursor molecule write down the biosynthetic pathway of glycine.
- (d) Draw the structure of creatinine. 3+2+3+2
4. (a) How is GMP synthesized from IMP?
- (b) 'Purine nucleotide biosynthesis is regulated by feedback inhibition' – Justify the statement.
- (c) How are deoxyribonucleotides synthesized from corresponding ribonucleotides? – Briefly describe the reduction process.
- (d) What is SCID? 3+3+2+2
5. (a) Write down the name and structure of precursor amino acid for melanin biosynthesis.
- (b) Name and draw the structure of the  $\alpha$ -keto acid resulting when each of the following amino acids undergoes transamination with  $\alpha$ -ketoglutarate :
- (i) Aspartate
  - (ii) Glutamate
  - (iii) Alanine
  - (iv) Phenylalanine. 2+(2×4)
6. (a) What are different ways to breakdown phenylalanine?
- (b) What is albinism? What is its cause?
- (c) Illustrate the reaction catalysed by thymidylate synthase with coenzymes/cofactors. What is the clinical significance of this enzyme? 3+(2+1)+(2+2)
7. (a) Name three important metabolites produced from tyrosine. Give the necessary reactions.
- (b) Mention one disorder related to adenosine catabolism pathway and give its cause.
- (c) What are the basic differences between the regulation of pyrimidine biosynthesis in prokaryotes and animals? (2+3)+(1+1)+3
8. (a) Write a note on oxidative deamination. Give one condition related to the disorder of this metabolic process.
- (b) Write down the overall urea cycle reaction and where it is synthesized.
- (c) Write the genetic defects of urea cycle. (4+1)+(2+1)+2
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