

2021

**BIOCHEMISTRY — HONOURS**

**Fifth Paper**

**(Module - IX)**

**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.*

Answer **question no. 1** and **any two** more questions, taking **one** from each **Unit**.

1. Answer **any ten** questions : 2×10
- (a) What happens when electron transport chain is uncoupled from oxidative phosphorylation? Name one uncoupler.
  - (b) What is serotonin? Which amino acid is its precursor?
  - (c) What is P.M.F?
  - (d) What is dark reaction?
  - (e) What is the basic difference between biosynthesis of purine and pyrimidine nucleotides?
  - (f) What are the differences between starch and cellulose?
  - (g) What is albinism?
  - (h) Name the carrier of the fatty acid transporter across mitochondria and give the reaction.
  - (i) Every metabolic pathway has at least one irreversible step which is regulated — Explain the statement with an example.
  - (j) What are the irreversible steps of glycolysis? Write the reactions involved with enzymes and coenzymes.
  - (k) How many turns of fatty acid oxidation cycles are required to oxidize stearic acid completely to acetyl CoA?
  - (l) Name two ketogenic and two glucogenic amino acids.
  - (m) What are the biological significances of branching of glycogen?
  - (n) What is alkaptonuria?
  - (o) What are the first purine and pyrimidine nucleotide synthesized by de novo pathway?

**Please Turn Over**

**Unit - I**

2. (a) Why plants but not animals can synthesize glucose from acetyl CoA?  
(b) What are the biological significances of branching of glycogen?  
(c) Although molecular oxygen does not participate directly in the citric acid cycle, the cycle operates only when oxygen is present. — Why?  
(d) What is complex V in electron transport chain? What are the functions of different components?  
(e) What is the most accepted hypothesis of mitochondrial energy coupling? 3+3+3+3+3
3. (a) Describe briefly the transport systems for NADH across the inner mitochondrial membrane. Which one is less efficient and why?  
(b) Why is the oxidation of succinate to fumarate associated with production of two ATPs during oxidative phosphorylation?  
(c) 'TCA cycle is amphibolic'. — Explain the statement with examples.  
(d) How does arsenic inhibit TCA cycle? — Explain with example.  
(e) What are common among the reactions catalyzed by hexokinase, phosphofructokinase and pyruvate kinase? 3+3+3+3+3

**Unit - II**

4. (a) What are the differences between mitochondrial and peroxisomal  $\beta$ -oxidation of fatty acids?  
(b) Antifolates are anticancer drugs. State their mode of action.  
(c) What is the importance of oxidative deamination reaction?  
(d) Give the biosynthetic pathway of triglycerides.  
(e) Briefly describe the salvage pathway for purine biosynthesis. FdUMP and methotrexate, when taken together, are less effective chemotherapeutic agents than when either drug is taken along. Justify the statement giving reasons. 3+3+3+3+3
5. (a) How are deoxyribonucleotides synthesized from corresponding ribonucleotides?  
(b) What are the sulfa drugs? Give their mode of action.  
(c) Identify the lipid synthesis pathway that would be affected by abnormally low level of CTP. Describe one such synthesis of lipid metabolism involving CTP.  
(d) Which nucleotide/s is/are involved in phospholipid synthesis? Show the steps of biosynthesis of lecithin.  
(e) Write down the pathway of phenylalanine breakdown. 3+(2+1)+(1+2)+(1+3)+2
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