



B. TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Third Semester

BIOTECHNOLOGY

U18BTI3203: Concepts in Biochemistry

COURSE OUTCOMES

- CO1:** Comprehend and evaluate the nutritional aspects and metabolism of carbohydrates.
- CO2:** Analyse and evaluate the dietary importance and metabolism of lipids.
- CO3:** Critically evaluate and analyse the structure and metabolic pathways of amino acids.
- CO4:** Interpret the metabolic disorders of amino acid metabolism and evaluate the functions of proteins
- CO5:** Imbibe the conformation and metabolism of nucleic acids and analyse the metabolic disorders of nucleic acids
- CO6:** Conceptualize the biological oxido-reduction reactions and respiratory chain

Time: Three Hours

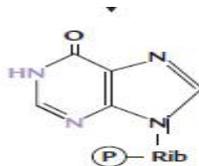
Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|--|-----|-------------------|
| 1. Name some homopolysaccharides and explain their significance. | CO1 | [K ₂] |
| 2. How is the entry of acetyl-CoA regulated by pyruvate dehydrogenase complex? | CO1 | [K ₃] |
| 3. What products are released upon complete hydrolysis of a phospholipid molecule? | CO2 | [K ₂] |
| 4. How many turns of fatty oxidation cycle is required for complete oxidation of arachidonic acid? | CO2 | [K ₄] |
| 5. How ammonia detoxication in the brain differs from liver? | CO3 | [K ₄] |
| 6. Give two examples for fibrous and globular proteins along with their functions. | CO4 | [K ₂] |
| 7. Identify the intermediate given below and give its significance. | CO5 | [K ₃] |



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|---|-----|-------------------|
| 8. Expand HGPRT. Name the inherited disorder caused by purine salvage enzyme. | CO5 | [K ₃] |
| 9. What do you understand by the term P:O ratio? Indicate diagrammatically the site of ATP generation in mitochondrial respiratory chain. | CO6 | [K ₃] |
| 10. Infer the role of uncouplers of oxidative phosphorylation. | CO6 | [K ₃] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|-----|----|--|----|-----|-------------------|
| 11. | a) | Explain glycolysis and its regulation. Elaborate the energetics of aerobic and anaerobic glycolysis. | 10 | CO1 | [K ₂] |
| | b) | Compare and contrast the structure and functions of starch and cellulose. | 6 | CO1 | [K ₂] |
| 12. | a) | Describe β -oxidation of a 16-carbon saturated fatty acid and its energetics. Explain the role of carnitine in fatty acid metabolism. | 10 | CO2 | [K ₂] |
| | b) | Classify the lipids with appropriate examples. | 6 | CO2 | [K ₂] |
| 13. | a) | Enumerate the biosynthetic pathway of any one aromatic amino acid from chorismate family. | 10 | CO3 | [K ₂] |
| | b) | Is Ammonia toxic to living systems? Justify the statement. | 6 | CO3 | [K ₄] |
| 14. | a) | Delineate the pathway for the <i>de novo</i> biosynthesis of purines (with structure) along with its regulation. | 12 | CO5 | [K ₂] |
| | b) | Compare the <i>de novo</i> pathways of purine and pyrimidine nucleotide synthesis with respect to (a) precursors (b) energy cost (c) acquisition of the ribose moiety (d) number of enzymatic steps. | 4 | CO5 | [K ₄] |
| 15. | a) | Illustrate the biochemical abnormalities and symptoms of phenylketonuria. | 6 | CO4 | [K ₂] |
| | b) | Infer the role of proteins in Alzheimer's disease. | 10 | CO4 | [K ₂] |
| 16. | a) | Describe the various components of electron transport chain. How do the oxidation of NADH and FADH ₂ takes place? | 10 | CO6 | [K ₃] |
| | b) | Define redox potential. Explain an experiment to measure the standard reduction potential. | 6 | CO6 | [K ₂] |
