



B.TECH DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Third Semester

B.Tech Biotechnology

U18BTT3001: Bioorganic chemistry

COURSE OUTCOMES

- CO1:** Recognize role of organic chemistry in biological reactions
CO2: Explain the chemical reactions of coenzymes and metal ions in biocatalysts
CO3: Evaluate the role of metal ions proteins and enzymes
CO4: Describe the chemistry of nucleic acids
CO5: Analyze the synthesis and properties of natural products
CO6: Demonstrate the techniques used to separate natural products

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

- | | | |
|--|-----|-------------------|
| 1. Illustrate the saponification and acid number of oils. | CO1 | [K ₂] |
| 2. Identify the geometry of the intermediate formed in the mechanism of transesterification. | CO1 | [K ₂] |
| 3. Predict the role of cyclodextrins. | CO2 | [K ₃] |
| 4. Justify the mechanism of Thiamine pyrophosphate. | CO2 | [K ₄] |
| 5. Classify the types of important metalloenzymes. | CO3 | [K ₂] |
| 6. Analyze the type of configurations which violate Hund's rule. | CO3 | [K ₄] |
| 7. Infer the role of chemical synthesis of DNA. | CO4 | [K ₂] |
| 8. Outline the function of aptamers. | CO4 | [K ₂] |
| 9. Recall the working principle of supercritical fluid extraction. | CO5 | [K ₂] |
| 10. List the applications of alkaloids. | CO5 | [K ₁] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

- | | | | |
|---|----|-----|-------------------|
| 11. a) Illustrate the Fischer and Haworth projections of carbohydrates in hemiacetal formation. | 10 | CO1 | [K ₂] |
| b) Determine the saponification and acid number of vegetable oils. | 6 | CO1 | [K ₄] |

- | | | | | | |
|-----|----|---|----|-----|-------------------|
| 12. | a) | Compound "A" is the active form of vitamin B6 serving as a coenzyme for synthesis of amino acids and it is available in many formulations to correct vitamin B6 deficiency. Identify compound "A" and illustrate the mechanism of action of coenzyme. | 10 | CO2 | [K ₄] |
| | b) | Explain the role of cyclodextrins and mention their use in drug delivery. | 6 | CO2 | [K ₂] |
| 13. | a) | Examine the role of important metalloenzymes. | 8 | CO3 | [K ₄] |
| | b) | Summarize the geometrical and optical isomerism in coordination complexes with examples. | 8 | CO3 | [K ₂] |
| 14. | a) | Outline the role of nucleic acids in the synthesis of proteins. | 8 | CO4 | [K ₂] |
| | b) | Summarize the characteristics of the fluorophore used for the single-labeled probes. | 8 | CO4 | [K ₂] |
| 15. | a) | Predict the super-critical fluid extraction method to extract bioactive compounds from natural sources with diagrammatic representation. | 10 | CO5 | [K ₅] |
| | b) | Discuss the types, properties and applications of alkaloids. | 6 | CO5 | [K ₂] |
| 16. | a) | The pharmacological efficacy of curcumin is compromised <i>in vivo</i> due to poor aqueous solubility, high metabolism, and rapid excretion that may result in poor systemic bioavailability. Analyze the methodology based on nanotechnology to overcome these problems, to enhance its bioavailability. | 12 | CO5 | [K ₄] |
| | b) | Infer the different extraction techniques for natural products. | 4 | CO5 | [K ₂] |
