



**B.TECH DEGREE EXAMINATIONS: APRIL / MAY 2023**

(Regulation 2018)

Fifth Semester

**BIOTECHNOLOGY**

**U18BTE0008: Neurobiology and Cognitive Sciences**

**COURSE OUTCOMES**

- CO1:** Comprehend the central and peripheral nervous system, and describe the structure and functions of neurons and supporting cells
- CO2:** Analyze the mechanism of action potential conduction and working of voltage dependent channels.
- CO3:** Illustrate the concept of synaptic transmission and mechanism of action of neurotransmitters.
- CO4:** Evaluate mechanism of sensations and skeletal muscle contraction
- CO5:** Enumerate the mechanisms associated with motivation behaviors
- CO6:** Summarize the various disorders of nervous system

**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. Classify the cortical pyramidal cell based on : i. the number of neurites and ii. the presence or absence of dendritic spines | CO1 | [K <sub>2</sub> ] |
| 2. Mention 3 main layers of tissue that protect the spinal cord  | CO1 | [K <sub>2</sub> ] |
| 3. Compare any mGluRs family with example  | CO2 | [K <sub>2</sub> ] |
| 4. Comments on: Mechanism of action potential  | CO2 | [K <sub>3</sub> ] |
| 5. Specify any two characteristics feature of chemical synapse   | CO3 | [K <sub>4</sub> ] |
| 6. How are spatial and temporal summation compared in chemical synapse?  | CO3 | [K <sub>4</sub> ] |
| 7. Somatosensory System: The ability to sense touch- Justify your answer   | CO4 | [K <sub>3</sub> ] |
| 8. How are perception and adaptation linked to understanding the sensation?  | CO4 | [K <sub>3</sub> ] |
| 9. Distinguish sympathetic and parasympathetic outputs of the autonomic nervous system.  | CO5 | [K <sub>2</sub> ] |
| 10. Draw a hypothetical model for the short-term regulation of feeding behavior  | CO6 | [K <sub>2</sub> ] |

**Answer any FIVE Questions**  
**PART B (5 x 16 = 80 Marks)**  
**(Answer not more than 400 words)**

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|-----|----|--|---|-----|-------------------|
| 11. | a) | Illustrate different phases of neural development core concepts to understand basics of neural anatomy   | 8 | CO1 | [K <sub>3</sub> ] |
|     | b) | Give your insight view of central nerve system and why can't the central nervous system repair itself after injury? - Justify with suitable illustration                         | 8 | CO1 | [K <sub>4</sub> ] |
| 12. | a) | Compare role of Receptor protein – Nicotinic receptor and muscarinic receptor  | 8 | CO2 | [K <sub>2</sub> ] |
|     | b) | Give insight knowledge on: Five categories of neuropeptide transmitters  | 8 | CO2 | [K <sub>2</sub> ] |
| 13. | a) | Dopaminergic diffuse modulatory systems arising from the substantia nigra and the ventral tegmental area- Justify the mechanism for understanding of dopamine function in brain? | 8 | CO3 | [K <sub>4</sub> ] |
|     | b) | Glutamate is the principal excitatory neurotransmitter; GABA is the principal inhibitory neurotransmitter in the brain – if it's true? If so, Justify.                           | 8 | CO3 | [K <sub>4</sub> ] |
| 14. | a) | Illustrate general properties of sensory systems with flow of signal.  | 8 | CO4 | [K <sub>3</sub> ] |
|     | b) | How does hair cell transduction take place within our ear? Explain with mechanism of audition.   | 8 | CO4 | [K <sub>3</sub> ] |
| 15. | a) | In Schizophrenia: how do people categorize symptoms with positive and negative? – Explain with suitable examples   | 8 | CO5 | [K <sub>3</sub> ] |
|     | b) | Give any of the four integrative functions of hypothalamus to understand basic physiological needs?  | 8 | CO5 | [K <sub>2</sub> ] |
| 16. | a) | How are Parkinson diseases subdivided and progression of disease explored by the neurologist during diagnosis?   | 8 | CO6 | [K <sub>3</sub> ] |
|     | b) | List any 4 warning symptoms with their specific behavior characteristics   | 8 | CO6 | [K <sub>3</sub> ] |

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