



B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(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 nervous and supporting cells
- CO2:** Analyse 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)

- | | | |
|--|-----|-------------------|
| 1. Specify nano meter (nm) range for microfilament, neurofilament and microtubules of neuron | CO1 | [K ₂] |
| 2. Abbreviate: BCSFB and BSCB. | CO1 | [K ₁] |
| 3. Distinguish absolute and refractory period in membrane action potential | CO2 | [K ₃] |
| 4. Saltatory conduction depends on Nodes on Ranvier -Justify the statement | CO2 | [K ₃] |
| 5. Classify neurotransmitters based on excitatory and inhibitory potential | CO3 | [K ₂] |
| 6. Draw a simple neuromodulator system | CO3 | [K ₂] |
| 7. Mention 4 types of muscle contractions | CO4 | [K ₂] |
| 8. Comments on: Hans Berger electroencephalography | CO4 | [K ₂] |
| 9. Correlate Darwin's evolutionary theory and theory of motivation | CO5 | [K ₃] |
| 10. Schizophrenia is a Psychotic disorder – Justify this statement | CO6 | [K ₃] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

- | | | | |
|--|---|-----|-------------------|
| 11. a) Recall various glial cells of central nerve system and peripheral nerve system | 8 | CO1 | [K ₂] |
| b) As a neutralist, you had an opportunity to stain the neural cells of patient suffered with neurodegenerative diseases. After visualizing neuronal morphology of | 8 | CO1 | [K ₃] |

specimens, suggest various classification system with suitable illustration to distinguish one neuron morphology with other.

12. a) Highlight any 4 properties of graded potential and action potential of neuron. 8 CO2 [K₂]
 b) Infer the membrane current and conductance for the unknown neuron with 3 8 CO2 [K₃]
 different state / conditions

State / Conditions	E _K	E _{Na}	g _k
a. All Na and K channel closed	-80 mV	62 mV	= 0
b. Both Na and K open	-80 mV	62 mV	> 0
c. At equilibrium state	-80 mV	62 mV	< 0

13. a) GABA, depolarize cells depending on the direction of the chloride gradient – 8 CO3 [K₃]
 Justify the statement with suitable scientific illustration
 b) Distinguish neuropeptides and neurotransmitters and give examples for each 8 CO3 [K₂]
14. a) Suggest suitable mechanism to understand physiology of taste and its transduction 8 CO4 [K₂]
 b) Give insight view on Skeletal Muscle Contraction and its mechanism. 8 CO4 [K₃]
15. a) Gives detailed view of famous theorist on Motivation 8 CO5 [K₂]
 1. Skinner 2. Maslow 3. Weiner Graham 4. Lave Wenger
 b) Compare and correlate five basic physiological function of hypothalamus 8 CO5 [K₃]
16. a) Classify mood disorders and distinguish each disorder with unique systems 8 CO6 [K₂]
 b) Identify the nerve disorders for the following symptoms and suggest suitable 8 CO6 [K₃]
 remedial measures:
 1. Person suffering with periodical disturbance in brain electrical conductivity and its leads to seizures, may be loss of consciousness and loss of sensory disturbance.
 2. Person suffering with progressive degenerative disease in brain and uniquely noticed with dementia and fatal.
