[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 508 **K**

Unique Paper Code : 2233010011

Name of the Paper : DSE-11- Basics of Neuroscience

Name of the Course : **B.Sc. (H) Zoology**

Semester : V (NEP-UGCF-2022)

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1** is compulsory.
3. Attempt **five** questions in all.
4. Draw neat, labelled diagrams wherever necessary.

1. (a) Define the following: **(1 x 5 = 5)**

a. Synaptic summation
b. Neuron Doctrine Theory
c. Resting Potential
d. Retrograde Amnesia
e. Ventricles

(b) Expand the following: **(1 x 5 = 5)**

a. NREM
b. fMRI
c. VLPO
d. APP
e. GABA

(c) Fill in the blanks: **(1 x 5 = 5)**

a. A sudden burst of 12–14 Hz rhythmic waves seen in NREM Stage 2 sleep is known as _____.
b. The _____ canal connects the third ventricle to the fourth ventricle.
c. The space between the arachnoid mater and pia mater is called the _____ space and is filled with cerebrospinal fluid.
d. Loss of the neurotransmitter _____ from neurons of the substantia nigra is a key feature of Parkinson's disease.
e. The band of nerve fibres connecting the two cerebral hemispheres is called the

(d) Name the contribution of the following: **(1×5 = 5)**

a. Hans Berger
b. Paul Broca
c. Charles Sherrington
d. Hodgkin and Huxley
e. Bernard Katz

(e) Differentiate between **(1×5 = 5)**

a. Grey matter and White matter
b. PET and fMRI
c. Ionotropic and Metabotropic Receptors
d. Procedural and Declarative Memory
e. Myelinated and non-myelinated neurons

2. (a) With the help of a detailed diagram of a neuron, explain the functional characteristics. **05**

(b) Discuss the concept of synaptic integration in neurons, describing how the interplay of EPSPs, IPSPs helps generate an action potential. **10**

3. (a) Define sleep. Distinguish between REM and NREM sleep. **05**

(b) Define and classify neurotransmitters. Explain how calcium influx triggers neurotransmitter release into the presynaptic terminal. **10**

4. (a) Describe the types of supporting cells within the central nervous system and elucidate their respective functions. **05**

(b) Elucidate the mechanism of amyloid precursor protein processing using a well-labelled diagram. Additionally, describe how amyloid plaques accumulate in Alzheimer's patients. **10**

5. Explain the stages of the memory process—acquisition, consolidation, retrieval, and extinction. Compare and contrast classical conditioning and operant conditioning as two major types of associative learning. **15**

6. Explain the architecture of human sleep. Describe the characteristic EEG rhythms, physiological features and functional significance. **15**

7. **Write short notes on the following (*Any three*):** **(3 x 5 = 15)**

a. Neural Coding
b. Cranial Nerves
c. G-Protein Coupled receptors
d. Placebo Effect