

2015

13 MAY 2015

**BIOCHEMISTRY****Paper – BCT 404****(Neurobiochemistry)****Full Marks – 25***The figures in the margin indicate full marks**Candidates are required to give their answers in their own words as far as practicable*

1. (a) Describe the structure and function of the various domains of the steroid receptor superfamily. 4
- (b) Describe the morphology and composition of dendrite spines. 3
- (c) How are dendritic spines structurally affected in neuro developmental disorders characterised by mental retardation? 1

*Or*

2. (a) Write a short note on the neurotrophic role of brain derived neurotrophic factor. 4
- (b) What is the masculinising hormone of the brain and how does it cause sexual dimorphism of the brain? 3
- (c) Name two diseases due to migratory disorders of the brain. 1
3. (a) Mention the key functions of blood brain barrier? 2
- (b) What is the role of AMPA receptor in LTP generation? 2
- (c) What is the major pathway for removing cholesterol from CNS? 1

*Or*

4. (a) Chose one from Column B which is most suitably connected with Column A. 3

Column A	Column B
Synapse	BBB
Glutamate	GABA
Metabotropic receptor	Vision
Glutamic acid decarboxylase	axon
Tight junction	5-HT1
Occipital lobe	NMDA

- (b) How do you catagorise neurotransmitters? (Give examples) 2

[Turn Over]

5. (a) What is the function of CSF ? 2  
 (b) What are the major structural components of blood brain barrier ? 2  
 (c) Name two  $\text{Na}^+$  dependent amino acid transporters of brain. 1

*Or*

6. (a) How does an ionotropic receptor differ from a metabotropic receptor ? Give example of each type of receptor. 2+1  
 (b) How do you explain compartmentalized metabolism in brain ? 2

7. Answer the following questions :

- (a) What are the key mechanisms involve in ageing process ? 1  
 (b) What are the pathological hallmarks of Alzheimer's disease and how one can check these in postmortem brain sections ? 2  
 (c) Name two transgenic mouse models of Alzheimer's disease. How they are helpful to understand the disease ? 2  
 (d) Mention true or false, if false correct it. 2  
 (i) Dementia is a part of normal ageing.  
 (ii) Mutations of SOD1 are linked to Huntington's disease.  
 (iii) Medium spiny neurons of striatum are mainly affected in Parkinson's disease.  
 (iv) Disorder of basal ganglia results in amyotrophic lateral sclerosis.

*Or*

8. Answer the following questions :

- (a) What are the common pathological characteristics of neurodegenerative disorders ? 1  
 (b) What is the cause of Huntington's disease ? Describe the molecular mechanisms of Huntington's disease. 2  
 (c) Name two neurotoxins that are used to make animal model of Parkinson's disease. What are the neuropathological features of Parkinson's disease ? 2  
 (d) What does amyotrophic lateral sclerosis mean? What neurons are affected by Amyotrophic lateral sclerosis ? 2