

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
FIRST SEMESTER 2016-17
BIO F313 ANIMAL PHYSIOLOGY
Mid-Semester EXAM (CLOSED BOOK)

Max. Marks: 35

Time: 90 mins

Date: 04/10/16

Note: "NO" marks would be allotted if you don't justify your answer.

Answers should not be more than 1-2 line. Marks will be deducted for unnecessary long answers.

Section A

1.
 - a. The brain of Einstein was found to have more of neuroglial cells than an average human. How do you think the presence these cells can enhance brain function? Elaborate. [2.0]
 - b. The rate of neurological disorders has increased over the years. A chemist friend of yours thought of addressing the problem by designing new drugs for brain disorders. He had a plant based highly charged molecule of 1 KDA size that he claimed to treat specifically **Schizophrenia**. How likely is he to be successful? Justify your answer. [2.0]
 - c. Neurons are non-excitable under relative refractory period. Do you agree? Justify your answer. [2.0]
 - d. Can you state the molecular reason to addiction to narcotics? [1.5]
 - e. A friend of yours was not able to concentrate on studies and was thoroughly disturbed by weird thoughts. Doctor advised him psychotherapy, which is known to heal the mind. Together, **neurofeedback** and psychotherapy is known to create lasting change and recovery. Based on your classes of nervous system, which region of your brain is tuned by the process of neurofeedback? Justify. [1.5]
2.
 - a. Can you schematically trace the flow of blood through the kidneys? [2.0]
 - b. Based on your understanding of excretory system, state what type of nephron a desert mole must be having? Justify your answer. [1.0]
 - c. Can chronic diabetes has the potential to affect GFR? Justify your answer. [2.0]
 - d. Why are the JG cells of kidney alternatively called as granular cells? What is the role of aldosterone released upon activation of RAS system? [2.0]
 - e. Differentiate the function between thick and thin ascending Henle's loop? [1.5]
 - f. Why countercurrent multiplier mechanism is so called. [1.0]
3.
 - a. Cells of Cajal generate BER. Justify the statement. [1.5]
 - b. Explain the physiological reason behind drying up of mouth under stressful situations. [1.0]
 - c. Only the upper part of the stomach, the fundus, is thick walled. Can you suggest an appropriate reason to it? [1.0]
 - d. Histamine, the molecule released by the arousal center of your brain also aids in digestion. Explain how. [1.0]

Section B

- 4 a.** What do you understand by collateral ventilation? Discuss its effect on ventilation. [1.5]
- b.** Breathing patterns have an enormous effect on alveolar ventilation. Explain in brief giving example. [2.0]
- c.** Amongst the two " P_{O_2} and P_{CO_2} ", which is the main regulator of ventilation. Justify your choice. [2.0]
- d.** What causes the newborn respiratory distress syndrome. Explain in brief [1.5]
- 5 a.** Suppose a drug blocks the voltage gated calcium channels. What effects it would impart on the generation of an action potential by a neuron. [1.5]
- b.** Action potential is an "all or none response". Still you can differentiate between two stimuli of varying strength. Explain. [1.5]
- c.** Suppose a mutation caused gated sodium channels to remain inactivated for a long after an action potential. What effects it will have on the generation of action potential. [2.0]