

## MANIPAL ACADEMY OF HIGHER EDUCATION

## FIRST MBBS DEGREE EXAMINATION – AUGUST 2019

## SUBJECT: PHYSIOLOGY- PAPER I (ESSAY)

Monday, August 19, 2019

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ Answer ALL the questions.

✍ Long Essays:

1. 22 year old woman presented with severe eye strain when she read for longer than a few minutes. She said that her eyes closed without her will, even though she was not sleepy. She became tired when she chewed food, brushed her teeth or dried her hair; and she had extreme fatigue on the job. She was evaluated by her physician, who suspected myasthenia gravis.

1A. With a labelled diagram of end plate potential, list the site and steps in its generation. What are the characteristics of end plate potential?

1B. Describe the significance of safety factor in neuromuscular transmission. How is it affected in this condition?

1C. Describe the cause of this disease and explain the physiological basis of treatment in this condition.

(5+2+3 = 10 marks)

2. A 30 year old married woman reported to an infertility clinic with inability to conceive. The plasma levels of the ovarian hormones and gonadotropins were measured at various points in her menstrual cycle.

2A. Trace and explain the pattern of secretion of ovarian hormones and gonadotropins during normal menstrual cycle.

2B. List the indicators of ovulation. Explain why the luteal phase of menstrual cycle is relatively constant.

(6+3+1 = 10 marks)

3. Short answer questions:

3A. Describe the propagation of action potential in unmyelinated nerve fibre and compare it with that in a myelinated fibre.

3B. Describe the mechanism of i) Referred pain ii) Descending analgesia

3C. Describe the formation, functions and drainage of aqueous humour. What is open and closed angle glaucoma?

3D. Using a flow chart, represent the steps and enzymes involved in synthesis of corticosteroids in the zona fasciculata and reticularis. Based on this, explain why 21-Beta hydroxylase deficiency leads to Congenital Adrenal Hyperplasia.

- 3E. Mention the clinical features of thyroid hormone deficiency in adults. Explain how the plasma levels of  $T_3$ ,  $T_4$  and TSH help in diagnosis of hypothyroidism.
- 3F. Outline the role of PTH and 1, 25-dihydroxy cholecalciferol in maintaining normal plasma calcium levels. What is Osteomalacia?
- 3G. Compare the physiological basis for clinical features seen in upper and lower motor neuron lesions.
- 3H. Based on connections, explain the functions of cerebocerebellum. Mention the clinical features of cerebellar disease.
- 3I. Describe how the sensory receptors code for i) Modality ii) Intensity discrimination.
- 3J. Mention the manifestations of damage to
- |  |                       |
|--|-----------------------|
| i) Ventromedial nucleus of hypothalamus      | ii) Prefrontal cortex |
| iii) Ventroposteromedial nucleus of thalamus | iv) Wernicke area     |
- 3K. Describe how central neurons integrate a variety of synaptic inputs through temporal and spatial summation.
- 3L. Explain the changes occurring in the eye during near response. What is Presbyopia?
- 3M. Describe the travelling wave concept for frequency discrimination. Mention the type of hearing loss caused by noise induced environment.
- 3N. Draw a labelled diagram of taste pathway.
- 3O. Explain the role of oxytocin in parturition and milk ejection.

(4 marks  $\times$  15 = 60 marks)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIRST MBBS DEGREE EXAMINATION – AUGUST 2019**  
**SUBJECT: PHYSIOLOGY– PAPER II (ESSAY)**

Tuesday, August 20, 2019

Time: 10:20 – 13:00 Hrs.

Max. Marks: 80

✍ **Essays:**

1. A 40-year-old male reported with complaints of severe chest pain. This was found to be of cardiac origin and was diagnosed as myocardial infarction. His ECG showed characteristic ST segment elevation. The coronary angiogram suggested plaques blocking one of the major coronary arteries. Appropriate treatment was initiated at the earliest.
  - 1A. Draw a normal electrocardiogram to illustrate the ST segment. What event does ST segment represent? What is *ST depression* suggestive of?
  - 1B. Explain the effect of coronary blockage on myocardial metabolism.
  - 1C. With respect to coronary blood flow, describe the pressure gradients and pattern of flow during phases of cardiac cycle.

(3+2+5 = 10 marks)

2. Describe the mechanism and regulation of different types of movements in small intestine. Add a note on *gastroileal* and *gastrocolic* reflexes.

(7+3 = 10 marks)

**3. Short Answer Questions**

- 3A. Graphically show the changes in myocardial contractility on the *Frank-Starling* curve. Explain physiological basis of the positive inotropic effect of digitalis group of drugs.
- 3B. Define 'Arterial pulse'. Draw a normal pulse wave. Explain the pulse in hypovolemic shock and in aortic regurgitation
- 3C. Give the physiological basis of the following:
  - i) Cutting of buffer nerves from baroreceptors results in wide fluctuation of mean arterial pressure during a day's activity
  - ii) Bradycardia in case of raised intracranial pressure
- 3D. Explain how pulmonary surfactant increases lung compliance.
- 3E. Write the steps of oxygenation of hemoglobin. List the factors that affect the affinity of hemoglobin for oxygen. What is  $P_{50}$ ?
- 3F. Explain the ventilatory response to changes in  $PCO_2$  with the help of a graph.
- 3G. Explain the functions of upper respiratory passages. Add a note on anatomical dead space.
- 3H. Explain any ONE mechanism responsible for each of the following:
  - i) Autoregulation of renal blood flow
  - ii) Voluntary control over micturition

- 3I. Explain the term '*Renal medullary interstitial hyperosmotic gradient*'. Mention its purpose. Mention the effect of medullary blood flow on the same.
- 3J. Explain the handling of bicarbonate in renal tubules. Give the significance of this process.
- 3K. Explain the role of skin in thermoregulation
- 3L. Explain the cause and salient features of hemophilia A. What lab tests diagnose this condition?
- 3M. Write briefly on Rh blood group system.
- 3N. Explain secondary active transport quoting any TWO examples
- 3O. Explain cephalic phase of gastric secretion

(4 marks × 15 = 60 marks)

