



**UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES**

**DEPARTMENT OF PHARMACY**

**FIRST BPHARM PART II EXAMINATION – AUGUST 2022**

**PH 1254 HUMAN BIOLOGY II– SEQ PAPER**

**TIME: THREE HOURS**

**INSTRUCTIONS**

- There are **six** questions in part **A, B, C, D, E and F** in this SEQ paper.
- Answer all questions.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.
- Use illustrations where necessary.

**PART A**

1.

1.1. Draw a diagram to illustrate the action potential of a nerve cell. **(10 marks)**

1.2. State one difference between nerve conduction in myelinated fiber and unmyelinated fiber. **(05 marks)**

1.3. Draw a diagram to illustrate pain pathway. **(15 marks)**

1.4. Pain fibers are connected at different locations of brain, e.g. thalamus, reticular activating system, hypothalamus, sensory cortex. What feature of pain is contributed by having connection to following locations?

1.4.1. Thalamus **(05 marks)**

1.4.2. Reticular activating system **(05 marks)**

1.4.3. Hypothalamus **(05 marks)**

1.4.4. Sensory cortex **(05 marks)**

1.5. Abdominal pain arising from intestine is minimized or relived by rubbing of the anterior abdominal wall. Explain the physiological basis for the above phenomenon. **(20 marks)**

1.6. Flaccid paralysis is a feature in lower motor neuron lesion. Explain the physiological basis for the above phenomenon. **(30 marks)**

## PART B

- 2.
- 2.1. What is a goiter? (10 marks)
- 2.2. List five causes for goiter. (10 marks)
- 2.3. State four clinical features of myxoedema. (10 marks)
- 2.4. Briefly describe the cause and features of cretinism. (10 marks)
- 2.5. Name two hormones that act on the kidney. (10 marks)
- 2.6. Briefly describe the effects of high concentration of these two hormones. (20 marks)
- 2.7. List two most important hormones responsible for calcium homeostasis and briefly describe their role. (30 marks)
- 3.
- 3.1.
- 3.1.1. What is diabetes mellitus? (10 marks)
- 3.1.2. State two hormones that are mainly contributing to maintain blood sugar level. (10 marks)
- 3.1.3. State three classic symptoms of uncontrolled diabetes mellitus and reasons for the above symptoms. (20 marks)
- 3.1.4. State two investigation that are commonly used to investigate high blood sugar levels. (10 marks)

## PART C

- 3.2.
- 3.2.1. Define Glomerular Filtration Rate (GFR). (2.5 marks)
- 3.2.2. Define renal clearance of a substance. (2.5 marks)
- 3.2.3. Calculate the renal clearance of creatine of an individual with the following parameters. (2.5 marks)
- urine creatine concentration = 35 mg/mL
- plasma creatine concentration = 0.25 mg/mL
- urine production = 0.9 mL/min
- 3.2.4. Define the renal threshold for glucose. (2.5 marks)
- 3.2.5. Briefly explain the renal compensatory mechanism when there is an extracellular fluid volume reduction. (10 marks)

- 3.2.6. State two methods operate in the kidney to maintain  $H^+$  ion homoeostasis. **(05 marks)**
- 3.2.7. What is a diuretic? **(05 marks)**
- 3.2.8. State the main action of,
- 3.2.8.1. Loop diuretics **(05 marks)**
  - 3.2.8.2. Thiazide diuretics **(05 marks)**
- 3.2.9. Explain the basis of giving following to a patient with chronic renal failure.
- 3.2.9.1 Recombinant erythropoietin **(05 marks)**
  - 3.2.9.2 Active vitamin D **(05 marks)**

#### **PART D**

4.

4.1.

- 4.1.1. List two functions of ovary. **(06 marks)**
- 4.1.2. State the main change that occur during follicular phase of the female reproductive cycle.
- 4.1.2.1. In the ovary **(03 marks)**
  - 4.1.2.2. In the uterus **(03 marks)**
  - 4.1.2.3. Draw a graph to illustrate FSH and LH levels during follicular phase of the female reproductive cycle **(08 marks)**
- 4.1.3.
- 4.1.3.1. List two hormones involved to establish or to maintain lactation. **(05 marks)**
  - 4.1.3.2. State two action of each hormone stated. **(10 marks)**
  - 4.1.3.3. Describe the milk ejection reflex. **(15 marks)**

#### **PART E**

4.2.

- 4.2.1. Explain the mechanisms of establishing and maintaining membrane potential in a skeletal muscle. **(20 marks)**
- 4.2.2. Explain the basis of giving neostigmine to treat myasthenia gravis. **(20 marks)**
- 4.2.3. Describe the differences between unitary smooth muscle and multiunit smooth muscle. **(10 marks)**



## PART F

5.

- 5.1. List five types of synovial joints. (15 marks)
- 5.2. Describe the key features of a synovial joint. (30 marks)
- 5.3. Illustrate the light microscopic histology of the wall of the urinary bladder. (20 marks)
- 5.4. List the developmental stages of gametes found in the seminiferous tubule. (10 marks)
- 5.5. Outline the gross anatomy of the adrenal gland. (25 marks)

6.

- 6.1. List the five types of sensory receptors found in five types of special senses with their cranial nerve innervations. (20 marks)
- 6.2. Name three types of proprioceptors found in the muscle tissue and their function. (15 marks)
- 6.3. Outline the components of the lymphatic system. (20 marks)
- 6.4. List the developmental stages of gametes found in an ovary during ovarian cycle. (15 marks)
- 6.5. Describe the key features of the cerebral hemispheres. (30 marks)

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