



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

**DEPARTMENT OF PHARMACY**

**FIRST BPHARM PART I EXAMINATION – DECEMBER 2023**

**PH 1144 HUMAN BIOLOGY I – SEQ PAPER**

**TIME: THREE HOURS**

**INSTRUCTIONS**

- There are six questions in part A, B, C, D and E of 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. A 25-year-old male had a significant bleeding following a road traffic accident. He was brought to the hospital. His pulse rate was 120 beats per minute and blood pressure was 100/60 mmHg. His hands and feet were cold and he was sweating. Doctors diagnosed that he was in shock. He was started on an intravenous infusion of saline.
  - 1.1 What is the type of shock he is in? (05 marks)
  - 1.2 Explain briefly the mechanism for cold extremities. (10 marks)
  - 1.3 Explain briefly the mechanism for his increased pulse rate. (30 marks)
  - 1.4 Explain the ion fluxes that occur in a pacemaker cell, using a labeled diagram. (25 marks)
  - 1.5 Explain briefly why a very high heart rate would lead to reduction in cardiac output. (10 marks)
  - 1.6 Which part of the vascular tree offers the highest amount of resistance? (05 marks)
  - 1.7 Explain briefly how he would benefit from the intravenous infusion of saline. (15 marks)

## PART B

- 2.
- 2.1 What is external respiration? (10 marks)
- 2.2 Outline the mechanism of inspiration (not necessary to explain the neural regulation). (30 marks)
- 2.3 Partial pressure of oxygen in the atmospheric air is about 160 mmHg and it is reduced 100 mmHg in the alveolar air. Explain the physiological basis for this change. (30 marks)
- 2.4 Briefly describe the modes of carbon dioxide transport in blood. (30 marks)

## PART C

- 3.
- 3.1 Explain briefly the functions of Glycocalyx of cell membrane. (25 marks)
- 3.2 Active transport differs from passive transport by its utilization of energy. Explain briefly the common features of active transport mechanisms. (25 marks)
- 3.3 State the three features that differs facilitated diffusion from simple diffusion. (15 marks)
- 3.4 Define the tonicity of a solution. (10 marks)
- 3.5 Explain the following statement; "Oral rehydration solution (ORS) works because of the Sodium Glucose Co-Transport System". (25 marks)
- 4.
- 4.1 State the receptor type that would show the following features. (20 marks)
- 4.1.1 Receptor type that mediates the most rapid cellular responses
- 4.1.2 The most abundant type of drug receptors
- 4.1.3 Receptor that mediates a long-lasting response
- 4.1.4 The intracellular domain of the receptor is either enzymatic active or is bound to specific enzyme(s) in the cytosol.
- 4.2 Define a ligand. (10 marks)
- 4.3 Explain the concept of partial agonists. (20 marks)

## PART D

- 4.4 List five functions of blood. (10 marks)
- 4.5 Explain briefly the formation of red cells, hemolysis and recycling processes in a healthy adult. (25 marks)
- 4.6 Explain briefly why liver failure develops an increased bleeding tendency. (15 marks)

## PART E

- 5.
- 5.1 Outline the three types of glands classified according to the modes of their secretion. (15 marks)
- 5.2 List four cell types found in the connective tissue. (10 marks)
- 5.3 Briefly describe the events that occur during the first week of human embryo development. (30 marks)
- 5.4 Outline five characteristic features of the epithelial tissue. (25 marks)
- 5.5 State the surface marking of the heart valves. (20 marks)
- 6.
- 6.1 Name two modified sweat glands found in the skin. (10 marks)
- 6.2 List four cell types found in the epidermis of the skin. (10 marks)
- 6.3 Briefly explain the three types of capillaries classified according to the structure of the capillary wall. (15 marks)
- 6.4 List the components of the lower respiratory tract and their epithelium. (20 marks)
- 6.5 Briefly describe the gross anatomy of the stomach. (30 marks)
- 6.6 Outline the structural adaptation of the small intestine to perform its function. (15 marks)

@@@@@@@@@@