



UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES

DEPARTMENT OF PHARMACY

FOURTH BPHARM PART I EXAMINATION – MARCH/APRIL 2026

PH 4141 CELL BIOLOGY AND IMMUNOLOGY – SEQ

TIME: TWO HOURS

INSTRUCTIONS

- There are **four** questions 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.

1.

- 1.1. Define cell-matrix interaction. *(10 marks)*
- 1.2. Draw a clearly labeled diagram of the cell membrane. *(20 marks)*
- 1.3. State five functions of the cell membrane. *(10 marks)*
- 1.4. Briefly describe the mechanism of endocrine signalling. *(30 marks)*
- 1.5. Discuss the characteristics and the applications of the embryonic stem cells. *(30 marks)*

2.

- 2.1. State the four types of defensive barriers that comprise innate immunity. *(10 marks)*
- 2.2. Briefly describe one barrier mentioned in 2.1 as a first-line defense mechanism in innate immunity. *(20 marks)*
- 2.3. Draw a clearly labeled diagram of the basic structure of an IgG antibody molecule, indicating the chains and functional regions involved, and state the functions of these different regions. *(35 marks)*
- 2.4. Discuss affinity, avidity, and cross-reactivity in the context of antigen-antibody interactions, highlighting their differences and biological significance. *(35 marks)*

3.

- 3.1. State the key characteristics of the innate immune response. *(15 marks)*
- 3.2. Briefly describe the process of phagocytosis, including the main steps involved and the cells responsible. *(20 marks)*
- 3.3. Describe the cell-mediated immune response, including the roles of T-lymphocytes and major histocompatibility complex (MHC) molecules. *(30 marks)*

- 3.4. Discuss why the absence of immunological memory in innate immunity is both advantageous and disadvantageous in different physiological conditions. (20 marks)
- 3.5. Briefly describe how the integration of innate immunity with adaptive immunity overcomes the disadvantages you mentioned in 3.4. (15 marks)

4.

- 4.1. State the typical reaction time and primary immunological mechanism (antibody-mediated or cell-mediated) for the four types of hypersensitivity reactions. (20 marks)
- 4.2. List five important chemical mediators released during a Type I hypersensitivity reaction. (20 marks)
- 4.3. Briefly describe the clinical manifestations, common allergens, and diagnostic tests used for Type I hypersensitivity reactions. (30 marks)
- 4.4. Briefly describe Type II hypersensitivity reactions, and explain how this mechanism leads to hemolytic disease of the newborn due to Rh incompatibility. (30 marks)

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