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UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES

DEPARTMENT OF PHARMACY

FOURTH BPHARM PART I EXAMINATION – NOVEMBER/DECEMBER 2023

PH 4141 CELL BIOLOGY & IMMUNOLOGY – SEQ PAPER

TIME: TWO HOURS

INSTRUCTIONS

- There are **four** questions in part A and B 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. List two methods of obtaining embryonic stem cells. (***10 marks***)

1.2. What is the difference between pluripotent, multipotent and unipotent in relation to stem cells? (***15 marks***)

1.3. Briefly describe induced pluripotent stem cells. (***20 marks***)

1.4. Briefly explain differences between embryonic and somatic stem cells. (***25 marks***)

1.5. Describe the primary ethical concern regarding the use of embryonic stem cells for research and the measures which can be taken to overcome this issue. (***30 marks***)

2.

2.1. List two major components of the innate immune response giving one example for each component. (***20 marks***)

2.2. Briefly describe the difference between active immunity and passive immunity. (***20 marks***)

2.3. State two main types of cells involved in acquired immunity and mention the major role of each cell type. (***20 marks***)

2.4. What are the two types of mechanisms in acquired immunity? (***10 marks***)

2.5. Describe one of the mechanisms mentioned in 2.4. (***30 marks***)

3.

3.1. List four types of hypersensitivity reactions mentioning the primary mediator for each type of reaction. (*20 marks*)

3.2. Write a short account on one of the hypersensitivity types mentioned in 3.1. (*30 marks*)

PART B

3.3. List two methods of protein quantification for SDS-PAGE (Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis). (*05 marks*)

3.4. State the importance of accurate protein quantification of the samples prior to loading. (*05 marks*)

3.5. Outline the fundamental principles underlying SDS-PAGE, including the role of SDS and how it contributes for the separation of proteins. (*25 marks*)

3.6. Briefly explain how following pH levels in the buffers facilitate protein stacking in SDS-PAGE.

Stacking gel: Tris-HCl buffer at pH 6.8, separating gel: Tris HCl buffer at pH 8.8, and running buffer in the tank: Tris-glycine at pH 8.3. (*15 marks*)

4.

4.1. Define following terms in immunology.

4.1.1. Immunity (*05 marks*)

4.1.2. Antigen (*05 marks*)

4.1.3. Hapten (*05 marks*)

4.1.4. Virulence (*05 marks*)

4.2. Define the fundamental structure of an antibody, delineating the roles of heavy and light chains, variable and constant regions, and the significance of disulfide bonds. (*30 marks*)

4.3. Briefly explain the methods of antibody fragmentations. (*25 marks*)

4.4. Describe in detail the following mechanisms of antibody action in the immune system, elucidating how antibodies function in

4.4.1. neutralization (*10 marks*)

4.4.2. antibody dependent cell mediated cytotoxicity. (*15 marks*)

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