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UNIVERSITY OF RUHUNA – FACULTY OF MEDICINE

ALLIED HEALTH SCIENCES DEGREE PROGRAMME

THIRD BPHARM PART II EXAMINATION – OCTOBER 2014

PH 3233: PHARMACEUTICAL BIOTECHNOLOGY (SEQ)

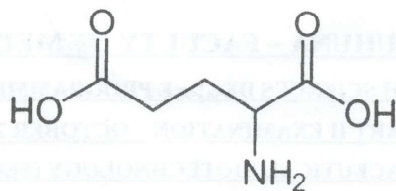
TIME: TWO HOURS

INSTRUCTIONS

- Answer all questions.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.

- 1.1 What are stem cells? (20 marks)
- 1.2 State the use of stem cells in biomedical sciences. (30 marks)
- 1.3 Briefly explain how stem cells can be engineered to generate transgenic mice. (35 marks)
- 1.4 Briefly describe the process of Somatic Cell Nuclear Transfer. (15 marks)
- 2.2.1 State the biological function of restriction endonucleases and briefly explain the adaption to protect the living organism from cleavage by the organism's own restriction endonucleases. (20marks)
- 2.2.2 State **five** unique features of restriction endonucleases. (20 marks)
- 2.2.3 Describe briefly the steps in construction of a recombinant DNA molecule. (20 marks)
- 2.2.4 What are the advantages of drugs/vaccines manufactured by recombinant DNA technology? (20 marks)
- 2.2.5 Explain briefly "The Human Genome Project" (20 marks)
3. Answer following questions based on downstream processing.
 - 3.1 State the **three** main steps in downstream processing. (12marks)
 - 3.2 What is the problem that would arise due to the presence of nucleic acids in protein preparations? (05marks)
 - 3.3 Name the **two** main methods that can be employed to remove cell nucleic acids. (08marks)
 - 3.4 Describe briefly the **two** methods mentioned in 3.3 (20marks)
 - 3.5 Separation of different types of proteins is a complicated process. What are the prominent characteristics of proteins that can be utilized in separation techniques? (15marks)

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Glutamic acid

- 3.6 The isoelectric point of Glutamic acid is at pH 3.22. Suppose you are trying to separate Glutamic acid from a mixture of amino acids. In this mixture Glutamic acid itself is at a high proportion.
- 3.6.1 What is the preferred method of choice? (05marks)
- 3.6.2 Describe briefly the significance of iso-electric point for the above mentioned method. (10marks)
- 3.6.3 Write **two** advantages of the selected method. (10marks)
- 3.6.4 During final formulation of therapeutic proteins, it is essential to add stabilizing agents to stabilize the purified proteins. Human Serum Albumin (HAS) is one such excipient. Describe briefly the advantages of HAS. (15marks)
- 4.
- 4.1
- 4.1.1 Explain briefly the limitations of edible plant vaccines? (20marks)
- 4.1.2 List **five** major advantages of edible plant vaccines over traditional vaccines. (20marks)
- 4.1.3 Explain briefly the method of production of “**second generation edible vaccines**”. (10marks)
- 4.2 Blood is used as a therapeutic tool in clinical practice. However, there are many complications/adverse events which can occur due to blood transfusions.
- 4.2.1 List **five** different complications of blood and blood products transfusion. (10marks)
- 4.2.2 List **four** blood derived products available in blood bank and indicate the storage conditions of each. (12marks)
- 4.2.3 List **four** “blood derived commercial products /substances” available in hospitals as therapeutic agents and state **one** physical property of each. (12marks)
- 4.2.4 Describe briefly how the risks associated with blood transfusions are minimized by using commercially available “blood products/ derived products” precisely. (16marks)