



**UNIVERSITY OF JAFFNA, SRI LANKA**  
**FACULTY OF ALLIED HEALTH SCIENCES**  
**FOURTH YEAR FIRST SEMESTER EXAMINATION IN BPharm Honours**  
**PHABT 4144 PHARMACEUTICAL BIOTECHNOLOGY**

**PART II**

**Date: 20.03.2023**

**Time: 02 Hours**

**Answer all six questions.**

**Answer part A and part B in separate answer books.**

**PART A**

1. 1.1 List the applications of fermentation. (20 Marks)
- 1.2 State the advantages of solid state fermentation. (20 Marks)
- 1.3 Explain the steps involved in the lysine production. (60 Marks)
  
2. 2.1 2.1.1 What are attenuated live vaccines? (10 Marks)
- 2.1.2 Give examples for attenuated live vaccines. (10 Marks)
- 2.1.3 List the advantages of attenuated live vaccines. (20 Marks)
- 2.2 Write a short note on the followings.
- 2.2.1 Adjuvants used in vaccine preparation. (30 Marks)
- 2.2.2 Toxoids. (30 Marks)
  
3. 3.1 Name two (02) short acting insulin analogues. (10 Marks)
- 3.2 Describe the structure of insulin. (45 Marks)
- 3.3 Briefly explain how the stability of insulin formulations is affected by the following factors.
- 3.3.1 Temperature (15 Marks)
- 3.3.2 Agitation (15 Marks)
- 3.3.3 pH (15 Marks)

**PART B**

4. 4.1 4.1.1 Define enzyme engineering. (10 Marks)
- 4.1.2 List the applications of enzyme engineering. (20 Marks)
- 4.2 List the main classes of enzymes. (20 Marks)
- 4.3 Discuss the importance of enzymes in pharmaceutical industry. (50 Marks)
  
5. 5.1 Define Pharmacogenetics. (10 Marks)
- 5.2 Briefly explain single nucleotide polymorphism (SNP). (40 Marks)
- 5.3 List some genes that alter the metabolism of drugs. (20 Marks)
- 5.4 Briefly discuss the benefits of pharmacogenetics. (30 Marks)

- 6. 6.1 Explain the steps involved in PCR. (30 Marks)
- 6.2 6.2.1. List the different types of gel electrophoresis. (10 Marks)
- 6.2 6.2.2. List the applications of the above mentioned gel electrophoresis. (15 Marks)
- 6.3 Write a short note on,
  - 6.3.1. southern blotting. (15 Marks)
  - 6.3.2. western blotting. (15 Marks)
  - 6.3.3. northern blotting. (15 Marks)