

THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. / B.Ed. DEGREE PROGRAMME – LEVEL 04
BYU4303 - PRINCIPLES OF MICROBIOLOGY
FINAL EXAMINATION -2025/2026
DURATION: TWO (02) HOURS



DATE 25th November 2025

TIME : 9.30 a.m – 11.30 a.m

Answer any four (04) of the six (06) Questions. All questions carry equal marks.
 Use fully labelled diagrams where appropriate.

1. a. What is meant by the term 'Genetic engineering' (10 marks)
 b. Briefly state the desirable characters found in plasmids that make them suitable vectors in genetic engineering (20 marks)
 c. With the help of suitable diagrams, describe the steps involved in producing 'human insulin' using a genetically engineered *E. coli* bacterium (70 marks)
2. a. Briefly describe the 4 nutritional categories of microorganisms (16 marks)
 b. Write a comprehensive account of energy yielding processes in organotrophic bacteria (74 marks)
 c. Giving examples where possible, list out five practical/ commercial applications of the processes mentioned above (10 marks)
3. a. Differentiate between a total count and a viable count of bacteria . (04 marks)
 b. Discuss the counting chamber and turbidity measurement with a spectrophotometer as methods of determining total count and the dilution plate method and MPN method as methods of determining viable counts of bacteria (80 marks)
 c. Mention one advantage and one disadvantage of each method above. (16 marks)
4. Write short notes on the following
 a. Wet mounts and Hanging drop method as means of observing live bacteria (34 marks)
 b. The antibiotic sensitivity test for determining the most suitable antibiotic against a bacterium (34 marks)
 c. The contribution by Louis Pasteur to the field of microbiology (32 marks)
5. a. Briefly describe the essential constituents of a culture medium used for culturing saprophytic microorganisms (20 marks)
 b. Discuss how temperature, pH and the gaseous atmosphere affect the growth of microorganisms (60 marks)
 c. Describe as a list an assay used to detect the effect of heavy metals on the growth of bacteria (20 marks)

6. a. Discuss instances and conditions where wet heat, dry heat and physical exclusion are used as antimicrobial physical agents in a microbiology laboratory (80 marks)
- b. Briefly describe the environmental conditions that could affect the activity of antimicrobial agents (20 marks)

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