UNIVERSITY OF KELANIYA – SRI LANKA
FACULTY OF SCIENCE
DEPARTMENT OF MICROBIOLOGY

Bachelor of Science Honours Degree Programme
Year 1, Semester II
Academic Year 2020/2021

End of Semester Examination
June 2023

Microbiology

MIBI 12532 – Introductory Microbiology

No. of Questions: Five (05) **Time: 02 hrs**

Answer any four (04) questions.

1.

a) Structural differences in the bacterial cell walls are used to differentiate Gram positive and Gram negative bacteria.

i) Describe the structure of the Gram positive cell wall. → thick peptidoglycan teichoic acid

(50 marks)

ii) Explain why Gram negative bacteria appear in pink after the Gram staining procedure?

(30 marks)

b) Describe the paracrystalline surface layer of Archaea.

(20 marks)

interlocking molecules of glycoprotein or protein

can have different form according to number of rows and bon

(Total 100 Marks)

lag, log, stationary, death

2.

a) Draw and describe the four phases of the growth curve of bacteria in a batch culture system.

(50 marks)

b) Explain the reasons for the following observations.

(i) **Actively growing bacterial cells** taken from a culture and inoculated into a fresh culture medium of the same composition will have a shorter lag phase.
as they are rapidly growing
(15 marks)

(ii) **Bacterial cells taken from a stock culture that has been stored in a refrigerator** and inoculated into a fresh culture medium of the same composition will have a longer lag phase. more time to get activated
(15 marks)

c) Discuss the practical importance of the bacterial growth curve in applied microbiology.

(20 marks)

(Total 100 Marks)

3.

a) Describe the major nutritional types of microorganisms that exist in the natural environment. PLA POH CLA COH CLH
(50 marks)

b) Explain the importance of macro and micronutrients to microorganisms
(30 marks)

c) List the functions that microorganisms play in their habitat.
(20 marks)

(Total 100 Marks)

4.

a) Define the terms 'anabolism' and 'catabolism'

(20 marks)

b) Describe why microorganisms enter fermentative pathways at low or no oxygen states.
(20 marks)

c) Explain the term 'substrate level phosphorylation' by giving relevant examples from glycolysis.
kinase.
(60 marks)

(Total 100 Marks)

Phosphofructo kinase-1
Pyruvate kinase
Hexokinase

5.

a) Describe the enzyme-mediated processes of chromosomal DNA replication in a bacterial cell based on the following series of events.

i) Start of the replication. → ori site

(20 marks)

ii) Initiation of the process of creating new strands over the template.

helicase

(20 marks)

iii) Synthesis of new strands in relation to the unwinding direction of the original DNA template.

DNA polymerase III I, ligase

(30 marks)

iv) Termination of the DNA replication process.

(20 marks)

b) "During the DNA replication mechanism, no additional energy is required for the activity of DNA polymerase." Explain the statement.

(10 marks)

(Total 100 Marks)