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University Examinations 2023/2024

THIRD YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE IN BIOCHEMISTRY

SHC 3350: APPLIED MICROBIAL BIOCHEMISTRY

DATE: APRIL 2024

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE (30 MARKS)

- a) Differentiate between the following terms: (4 marks)
- i. Anabolism
 - ii. Catabolism
- b) Outline the overall reaction formulae that sums up the biochemistry of nitrogen fixation (2 marks)
- c) Outline the similarities between oxidation and fermentation in microbial cells (4 marks)
- d) Explain the role of oxygen as a requirement for microbial growth (4 marks)
- e) Explain how *E. coli* responds to hypoosmotic stress (4 marks)
- f) Describe the roles of the following in microorganisms (4 marks)
- i. nod genes

ii. molecular chaperons

g) State the NADH producing steps of the TCA cycle (4 marks)

h) Explain how microorganisms protect themselves from toxic oxygen intermediates (4 marks)

QUESTION TWO: (20 MARKS)

Discuss microbial growth cycle in batch culture (20 marks)

QUESTION THREE: (20 MARKS)

Discuss the nodulation process in nitrogen fixation (20 marks)

QUESTION FOUR: (20 MARKS)

Illustrate all the steps in the citric acid cycle (20 marks)