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University Examinations 2023/2024

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

SHC 3454: COMPARATIVE BIOCHEMISTRY

DATE: APRIL 2024

TIME: 2 HOURS

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

QUESTION ONE (30 MARKS)

- a) Describe the following homeostatic feedback regulations
 - i. Negative feedback (3 marks)
 - ii. Positive feedback (3 marks)
- b) Explain why ribosomal RNA (rRNA) sequence is used in taxonomic classification of all living organisms (5 marks)
- c) Describe how hypoxia affects the functions of cells (5 marks)
- d) Outline principle characteristics of metabolic pathways common to the three domains of life (5 marks)
- e) Explain how biochemical evidence supports molecular evolution (5 marks)
- f) Illustrate the main steps of DNA replication process that have been conserved in both eukaryotes and prokaryotes (4 marks)

QUESTION TWO (20 MARKS)

- a) Describe mechanisms by which multicellular organisms respond and adapt to variations in oxygen availability (10 marks)
- b) Discuss ways by which cells regulate their metabolic pathways (10 marks)

QUESTION THREE (20 MARKS)

- a) Outline differences in gene regulation between prokaryotes and eukaryotes (10 marks)
- b) Discuss evolutionarily conserved cell-signalling pathways and their roles in different species (10 marks)

QUESTION FOUR (20 MARKS)

Classify proteins based on:

- a. Biological functions (7 marks)
- b. Composition and solubility (13 marks)