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University Examinations 2023/2024

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

SHD 3354: EUKARYOTIC GENE EXPRESSION

DATE: APRIL 2024

TIME: 2 HOURS

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

QUESTION ONE (30 MARKS)

- a) Outline the levels of gene regulation in eukaryotes (5 marks).
- b) Explain the techniques used in introducing gene sequences into plant cells (6 marks).
- c) Describe the composition of eukaryotic transcription preinitiation complex (5 marks).
- d) Outline mechanisms of chromatin remodelling (4 marks).
- e) Devise the most reasonable hypotheses that explain the ability of eukaryotic enhancers to act at a distance (4 marks).
- f) Outline advantages of using insect cell expression systems to produce recombinant proteins (6 marks).

QUESTION TWO (20 MARKS)

- a) Discuss applications of small non-coding RNAs (10 marks).
- b) Describe classes of DNA-binding motifs that regulate gene expression in eukaryotes (10 marks).

QUESTION THREE (20 MARKS)

- a) Describe post-translational modifications of histone proteins (10 marks).
- b) Discuss cell-signalling pathways and their roles in eukaryotic embryonic development (10 marks).

QUESTION FOUR (20 MARKS)

- a) Explain biomedical applications of transgenic animals (10 marks).
- b) Describe nuclear receptors and their resultant physiological functions (10 marks).