

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

BACHELOR OF SCIENCE HONOURS DEGREE EXAMINATIONS

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

THEORY: ADVANCED CELL BIOLOGY SBB 4204

DECEMBER 2002

3 HOURS (100 marks)

INSTRUCTIONS

Answer Four (4) Questions. Each question carries 25 marks. Where a question contains subdivisions, the mark value for each subdivision is given in brackets. Illustrate your answer where appropriate with large, clearly labelled diagrams.

1. Describe and discuss the role of chromatin structure in the control of gene expression. (25 marks)

- 2(a) Plasmids of the PUC family especially PUC19 and PUC18 are routinely used in cloning experiments.
Describe the desirable features of PUC19 that are relevant to cloning. (17 marks)
- (b) Write short notes on the features of a good prokaryotic host for cloning purposes. (8 marks)

- 3(a) Write short notes on
 - (i) Nucleosomes (4 marks)
 - (ii) Downstream events of mitosis induced by MPF (8 marks)
- (b) Describe three ways in which a proto-oncogene can be made oncogenic (13 marks)

- 4(a) Define and describe the following terms giving examples where appropriate
 - (i) Insertional inactivation (6 marks)
 - (ii) Replacement vector (4 marks)
- (b) Discuss the significance of the separation of processes such as transcription and translation in eukaryotes. (15 marks)

- 5(a) Describe and show how replication of damaged DNA can lead to chromosome abnormalities and gene amplification. (10 marks)
- (a) Write short notes on eukaryotic RNA polymerases and explain the regulation of transcription by RNA polymerases I and III. (15 marks)

6. Why did self incompatibility evolve in flowering plants? Describe and discuss gametophytic and sporophytic self incompatibility in flowering plants. (25 marks)

END OF QUESTION PAPER