



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

BACHELOR OF SCIENCE HONOURS DEGREE

MAY 2011

ADVANCED MOLECULAR CELL BIOLOGY SBB 4204

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. (a) Briefly describe the following:
 - (i) Ion-channel-coupled receptors; and (3 marks)
 - (ii) G-coupled receptors. (3 marks)

- (b) (i) List six principle classes of enzyme-coupled receptors. (6 marks)

- (ii) Using the insulin receptor as a typical example, describe the receptor tyrosine kinase-mediated signal transduction. (13 marks)

2. (a) Outline the key characteristic behavior of cancer cells. (10 marks)

- (b) With respect to cancer, describe briefly the following:
 - (i) metastasis; and (9 marks)

 - (ii) angiogenesis (6 marks)

3. Describe plant tissue culture and its application to micropropagation, production of disease free plants and genetic engineering.

4. Discuss how bioinformatics has been exploited in the field of molecular phylogenetics.

5. (a) Describe the cell cycle and its regulation. (20 marks)

- (b) Briefly describe cell crawling. (5 marks)

6. (a) Describe the structure of the sarcomere of a skeletal muscle myofibril and the changes that occur during muscle contraction. (16 marks)

- (b) Briefly describe the mechanism of actin polymerization. (9 marks)

END OF EXAMINATION

