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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2014/2015**

COURSE NAME : INTRODUCTION TO BIOTECHNOLOGY
COURSE CODE : BNN 10103
PROGRAMME : 1 BNN
EXAMINATION DATE : DECEMBER 2014/ JANUARY 2015
DURATION : 3 HOURS
INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) Biotechnology is a broad discipline focuses on a variety of research areas:
- (i) Define the term of biotechnology
 - (ii) Propose how it might improve the lives of human
- (3 marks)
- (b) Give **ONE (1)** example of biotechnology application for the following terms:
- (i) Antibiotic
 - (ii) Transgenic Organism
- (4 marks)
- (c) Microscopes are essential for biotechnology studies. Define the term below in microscopy application:
- (i) Magnification
 - (ii) Resolution
 - (iii) The upper limit of magnification for a light microscope
- (6 marks)
- (d) Motility in microorganism is commonly associated with flagella. Summarize how does the bacterial flagellum move a cell forward.
- (6 marks)
- (e) Pasteur's experiments on spontaneous generation were of enormous importance for the advance of microbiology, having an impact on the methodology of microbiology ideas on the origin of life, and the preservation of food, to name just a few. Briefly explain how the impact of his experiments was felt on each topic listed below:
- (i) Basic methodology in microbiology
 - (ii) Food science
- (6 marks)
- Q2** (a) (i) Define the term 'nucleotide'.
- (3 marks)
- (ii) Explain how does the nucleoside differ from a nucleotide.
- (5 marks)
- (b) Differentiate the primary, secondary, and tertiary structure with respect to protein.
- (6 marks)
- (c) Cells have a variety of organelles, each with a specific function. The organelles must work together in order for the cell to survive.
- (i) Explain the function of a chloroplast and mitochondria. Include a basic description of the chemical reaction that takes place in each organelle.
- (5 marks)
- (ii) Relate how the chloroplast and mitochondria work together to help a plant cell survive.
- (5 marks)

- (d) Predict what would happen if a plant cell lacked of mitochondria. Justify your answer. (2 marks)
- Q3** (a) Categorizes enzymes classification according to the reactions that they catalyze. (3 marks)
- (b) Illustrate the chemical reaction for the enzymes that cleave bonds by adding water. Name the classification of enzyme involves. (3 marks)
- (c) Summarizes the term below:
 (i) Cofactors
 (ii) Coenzymes (4 marks)
- (d) There are many different enzymes located in the cytoplasm of a single cell. Illustrate in diagrams how a specific enzyme is able to catalyze a specific reaction. Explain your diagrams accordingly. (7 marks)
- (e) The environment surrounding an enzyme can have a direct effect on enzyme function.
 (i) Discuss the best optimum for temperature and pH that associated with maximal function of enzymes.
 (ii) Give **ONE (1)** example for each environment effect. (8 marks)
- Q4** (a) Define the term ‘ gene transfer’. (2 marks)
- (b) Identify **TWO (2)** pros and **TWO (2)** cons of gene therapy. (4 marks)
- (c) (i) Explain the principal of polymerase chain reaction (PCR).
 (ii) Give **ONE (1)** example for the application of PCR in biotechnology. (4 marks)
- (d) Summarize the steps for the most common type of gene transfer. (6 marks)
- (e) Give **TWO (2)** benefits and relates it with **ONE (1)** example of genetically modified organisms (GMOs) for each different areas below:
 (i) Crops
 (ii) Animals
 (iii) Environment (9 marks)

- Q5** (a) Compare the term of bioremediation and xenobiotics. (4 marks)
- (b) Explain the importance of yeasts for industrial application. (5 marks)
- (c) Explain the drawbacks of vaccines. (3 marks)
- (d) List **FIVE (5)** contributions of biotechnology in the area of medicine. (5 marks)
- (c) Describe **TWO (2)** categories of microbial infection in food and relates each categories with **ONE (1)** example. (8 marks)

END OF QUESTION