



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION SEMESTER I SESSION 2019/2020

COURSE NAME : INTRODUCTION TO BIOTECHNOLOGY
COURSE CODE : DAK 23803
PROGRAMME CODE : DAK
EXAMINATION DATE : DECEMBER 2019 / JANUARY 2020
DURATION : 2 HOURS 30 MINUTES
INSTRUCTION : ANSWERS **FIVE (5)** QUESTIONS ONLY

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

- Q1.** (a) (i) Define cell. (1 mark)
- (ii) Describe the statement “cell is the fundamentals of life”. (3 marks)
- (iii) Differentiate prokaryotic cell and eukaryotic cell. (4 marks)
- (b) Sketch the structure and give the functions of organelles listed below:
- (i) Plasma membrane. (2 marks)
- (ii) Ribosome. (2 marks)
- (iii) Rough endoplasmic reticulum. (2 marks)
- (iv) Mitochondria. (2 marks)
- Q2.** Cell cycle of eukaryotic cell involve of non-mitotic phase and mitotic phase.
- (a) Describe all subphase in non-mitotic phase. (5 marks)
- (b) Sketch and describe all subphase in mitosis process of eukaryotic cell. (15 marks)
- Q3.** (a) Cells are build up from biological macromolecules that contain carbon as the backbone of the macromolecules.
- (i) State and explain the process that build up macromolecules. (3 marks)
- (ii) State and explain the process that broken down macromolecules. (3 marks)
- (iii) Sketch the synthesis process to produce maltose. (2 marks)
- (b) (i) Define protein. (1 mark)
- (ii) Draw the basic structure of amino acid. (2 marks)
- (iii) State the main groups of amino acid and describe the structure of each group. (3 marks)

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- (c) (i) Describe lipid structure and the behavior of lipid with water. (2 marks)
- (ii) Fat and oil are lipids. Differentiate both according its structure. (2 marks)
- (iii) Describe the structure of triglyceride and phospholipid. (2 marks)
- Q4.** (a) (i) Describe cellular metabolism. (3 marks)
- (ii) State the energy of life. (1 mark)
- (iii) Sketch the structure of **Q4(a)(ii)**. (3 marks)
- (iv) Describe the function of **Q4(a)(ii)** and explain how the structure store and release energy. (4 marks)
- (b) (i) Define enzyme. (1 mark)
- (ii) Describe the characteristics of enzyme. (3 marks)
- (iii) State the molecule that sometimes an enzyme needs to perform reaction. (1 mark)
- (iv) Sketch enzyme reaction that involve **Q4(b)(iii)**. (4 marks)
- Q5.** (a) (i) Describe microbial growth curve. (4 marks)
- (ii) Write how knowledge on bacterial growth curve is important in biotechnology industries. (4 marks)
- (b) (i) Describe the importance of cell quantification. (2 marks)
- (ii) Explain **two (2)** method to quantify cell of bacteria. (4 marks)
- (c) (i) Describe foam control system in a stirred tank bioreactor. (4 marks)
- (ii) Sketch mechanism of temperature control in a simple bioreactor. (2 marks)

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- Q6.** (a) Use your own words to relate the process involve in gene expression of protein (transcription, translation). (6 marks)
- (b) (i) Write all steps in cloning a single piece of DNA. (5 marks)
- (ii) Describe **four (4)** applications of recombinant DNA technology and gene manipulation. (8 marks)
- (iii) Write an example of ethic issue in gene manipulation. (1 marks)
- Q7.** Applications of biotechnology in food industries are including fermentation products and whole cell product.
- (a) Select **one (1)** product and sketch production process flow diagram. (5 marks)
- (b) Describe in details each of the process/equipment involved. (10 marks)
- (c) State **two (2)** alternatives suggestion that can improve the production profit. (4 marks)
- (d) Name **two (2)** products of fermentation from Malaysia. (1 mark)

- END OF QUESTIONS -

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