



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION

SEMESTER I

SESSION 2021/2022

COURSE NAME : CELL AND MOLECULAR BIOLOGY

COURSE CODE : BWJ 21203

PROGRAMME CODE : BWW

EXAMINATION DATE : JANUARY / FEBRUARY 2022

DURATION : 3 HOURS

INSTRUCTION : 1. ANSWER **ALL** QUESTIONS.

2. THIS FINAL EXAMINATION IS AN **ONLINE** ASSESSMENT AND CONDUCTED VIA **OPEN BOOK**.

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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- Q1** (a) Describe how "*natura non facit saltus*" and "*scala naturae*" change our understanding on cell biology?
(6 marks)
- (b) By using your understanding on protein structure, discuss how protein can accurately fold into its final conformation.
(6 marks)
- (c) Outline **FOUR (4)** different mechanisms that allow the active sites of an enzyme to perform catalysis while speeding up reaction and lowering activation energy barrier.
(8 marks)
- Q2** (a) Demonstrate the importance of membrane carbohydrates in immune response of an organism. Provide **ONE (1)** example to support your answer.
(6 marks)
- (b) By providing appropriate example, explain the diversity of genomes in organisms.
(4 marks)
- (c) Demonstrate step by step how protein interactions help the packaging of 2 nm double-helix structure of DNA sequence into 700 nm chromatid containing hundreds to thousands of gene.
(10 marks)
- Q3** (a) Differentiate **TWO (2)** metabolic controls involving gene expression in prokaryotes that avoids wasting resources to produce a substance readily available in a cell.
(8 marks)
- (b) Differentiate **TWO (2)** types of negative gene regulation in prokaryote by providing appropriate example for each.
(6 marks)
- (c) Explain **THREE (3)** mechanisms of gene regulation in eukaryote.
(6 marks)
- Q4** (a) State **FOUR (4)** important process to extract, manipulate and analyze nucleic acids.
(4 marks)
- (b) Explain the functions of DNA Ladder and DNA dye in electrophoresis process.
(4 marks)
- (c) Demonstrate **THREE (3)** significant contributions of biotechnology during the current COVID-19 pandemic.
(6 marks)

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- (d) Analyze the implications of commercializing genetically modified organism agricultural products to environment in Malaysia.

(6 marks)

- Q5** (a) Describe **FOUR (4)** sources of genetic variation in a wild population of *Manis javanica* that have been accumulated over 16 million years of its evolutionary history in Southeast Asia.

(8 marks)

- (b) Demonstrate how the factors of random mating and extremely large population size contribute to Hardy-Weinberg equilibrium model.

(4 marks)

- (c) Captive breeding programme for *Panthera jacksonii* are showing promising results in increasing the number of individuals of the species in Malaysia. Scientist however are concerned on the low genetic diversity of this iconic species, especially from inbreeding of captive populations. Outline **FOUR (4)** importances of genetic diversity in ensuring the long-term viability of this species in Malaysia.

(8 marks)

– END OF QUESTIONS –

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