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University Examinations 2023/2024

FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF MASTER OF
SCIENCE IN MOLECULAR BIOLOGY

SZE 5101: ADVANCED MOLECULAR BIOLOGY

DATE: DECEMBER 2023

TIME: 3 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE (30 MARKS)

- Explain the meaning of, biotechnology, genetic engineering and any three practical applications of molecular biology (5 marks)
- Explain direct and indirect gene transfer, briefly describing the role of *Agrobacterium tumefaciens* in GMO development (5 marks)
- Discuss at least two ethical considerations that would need to be considered while developing products employing next generation sequencing (5 marks)
- Briefly discuss any four proteins involved in the DNA replication in eukaryotes and name any inhibitors of translation and its mode of action (5 marks)

QUESTION TWO (20 MARKS)

- Describe the process of regulation of gene expression in Lac operon (10 marks)
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MUST is ISO 9001:2015 and



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- b) Discuss various characteristic motifs in DNA binding proteins (10 marks)

QUESTION THREE (20 MARKS)

- a) Discuss structural polymorphism in DNA and how B-DNA is converted into other DNA forms (12 marks)
- b) Describe the process of DNA replication in E.coli (8 marks)

QUESTION FOUR (20 MARKS)

- a) Discuss any four classes of restriction endonucleases (8 marks)
- b) Discuss the *HRAP* gene and its role in genetic engineering of plants for bacterial disease resistance (12 marks)

