



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCES
DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

BACHELOR OF SCIENCE HONOURS DEGREE IN APPLIED
BIOLOGY AND BIOCHEMISTRY

Introduction to Molecular Biology SBB 2216

EXAMINATION PAPER
MAY 2017

This examination paper consists of 2 pages

Time Allowed: 3 hours
Total Marks: 100
Special Requirements: NONE

INSTRUCTIONS TO CANDIDATES

- 1. Answer Four (4) Questions. Each question carries 25 marks.**
- 2. Where a question contains subdivisions, the mark value for each subdivision is given in brackets.**
- 3. Illustrate your answer where appropriate with large, clearly labelled diagrams.**

1. Discuss gene structure in eukaryotes and prokaryotes, highlighting the major differences.
2. Describe, in detail, the process of DNA replication in *Escherichia coli*.
3. Explain the importance of the following in the process of translation in prokaryotes:
 - (a) The ribosome binding site. (4 marks)
 - (b) Aminoacyl-tRNA synthetases. (6 marks)
 - (c) 23S rRNA. (5 marks)
 - (d) The genetic code. (5 marks)
 - (e) The 50S subunit of the ribosome. (5 marks)
4. (a) Explain the following terms as they are used in molecular biology:
 - (i) Constitutive expression. (2 marks)
 - (ii) Strong promoter. (3 marks)
 - (iii) Polycistronic mRNA. (2 marks)
 - (iv) Structural genes. (2 marks)(b) Explain how the *Lac* operon is regulated. (16 marks)
5. (a) Describe the B form of DNA and briefly compare it to the Z and A forms. (10 marks)
(b) Briefly outline the different types of DNA mutations that can occur in living organisms. (15 marks)
6. Compare genome organisation in prokaryotes and eukaryotes and discuss the roles of naturally occurring plasmids in these organisms.

END OF EXAMINATION

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