



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCE

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

BACHELOR OF SCIENCE HONOURS DEGREE IN APPLIED BIOLOGY AND
BIOCHEMISTRY

MOLECULAR GENETICS AND BIOTECHNOLOGY SBB 2214

Special Examination Paper

AUGUST 2024

This Examination Paper consists of 2 pages

Time Allowed: 3 hours
Total Marks: 100
Special Requirements: NONE
Examiner: PROF J. MBANGA

INSTRUCTIONS

1. Answer (4) Questions.
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.

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5	25
6	25
TOTAL	100

1. (a) Explain the following terms as used in molecular genetics:
 - (i) Polycistronic mRNA. (2 marks)
 - (ii) Regulated expression. (2 marks)
 - (iii) Constitutive expression. (2 marks)
 - (iv) Positive and negative regulation. (4 marks)(b) Discuss the regulation and catabolite repression of the *lac* operon. (15 marks)
2. Give an account of the genetic structures found in prokaryotic and eukaryotic DNA.
3. Write an essay on prokaryotic DNA replication.
4. Describe and explain how you would create a recombinant DNA molecule using a plasmid vector and proceed to select host cells containing your recombinant DNA molecule after transformation.
5. Write an essay on any **four** types of the polymerase chain reaction, highlighting their applications in biotechnology.
6. Discuss **one** biotechnology application from medicine and agriculture that have had the greatest impact on human livelihoods.

END OF EXAMINATION PAPER