

UNIVERSITY EXAMINATIONS

FIRST SEMESTER 2025/2026 ACADEMIC YEAR

**THIRD YEAR EXAMINATION FOR THE DEGREE OF
BACHELOR OF BIOMEDICAL SCIENCE AND
TECHNOLOGY**

BMED 314: MOLECULAR BIOLOGY OF THE GENE

STREAM: R

TIME: 2 HRS

DAY: WEDNESDAY [2.30 – 4.30 P.M]

DATE: 04/02/2026

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.

Answer all the questions in section A and any of the two questions in B

SECTION A (40 MARKS)

QUESTION ONE

Outline the structure of a nucleotide and explain its components. (5 Marks)

QUESTION TWO

List the major differences between DNA and RNA. (5 Marks)

QUESTION THREE

Outline the thermal properties of DNA and their significance. (5 Marks)

QUESTION FOUR

List the different types of cloning vectors and their characteristics. (5 Marks)

QUESTION FIVE

Illustrate Polymerase Chain Reaction (PCR) technique. (5 Marks)

QUESTION SIX

Explain the process of DNA replication and its enzymes. (5 Marks)

QUESTION SEVEN

Elaborate the double-stranded break (DSB) repair model for homologous recombination. (5 Marks)

QUESTION EIGHT

Explain the genetic code and its characteristics. (5 Marks)

SECTION B (30 MARKS) : ANSWER ONLY TWO (2) QUESTIONS

QUESTION NINE (15 MARKS)

Discuss the regulation of gene expression in prokaryotes.

(15 Marks)

QUESTION TEN (15 MARKS)

Describe the different types of DNA mutations and their effects.

(15 Marks)

QUESTION ELEVEN (15 MARKS)

Discuss the consequences of DNA damage and repair defects.

(15 Marks)