

UNIVERSITY OF ESWATINI
FACULTY OF SCIENCE AND ENGINEERING
DEPARTMENT OF BIOLOGICAL SCIENCES

MAIN EXAMINATION PAPER 2018/2019

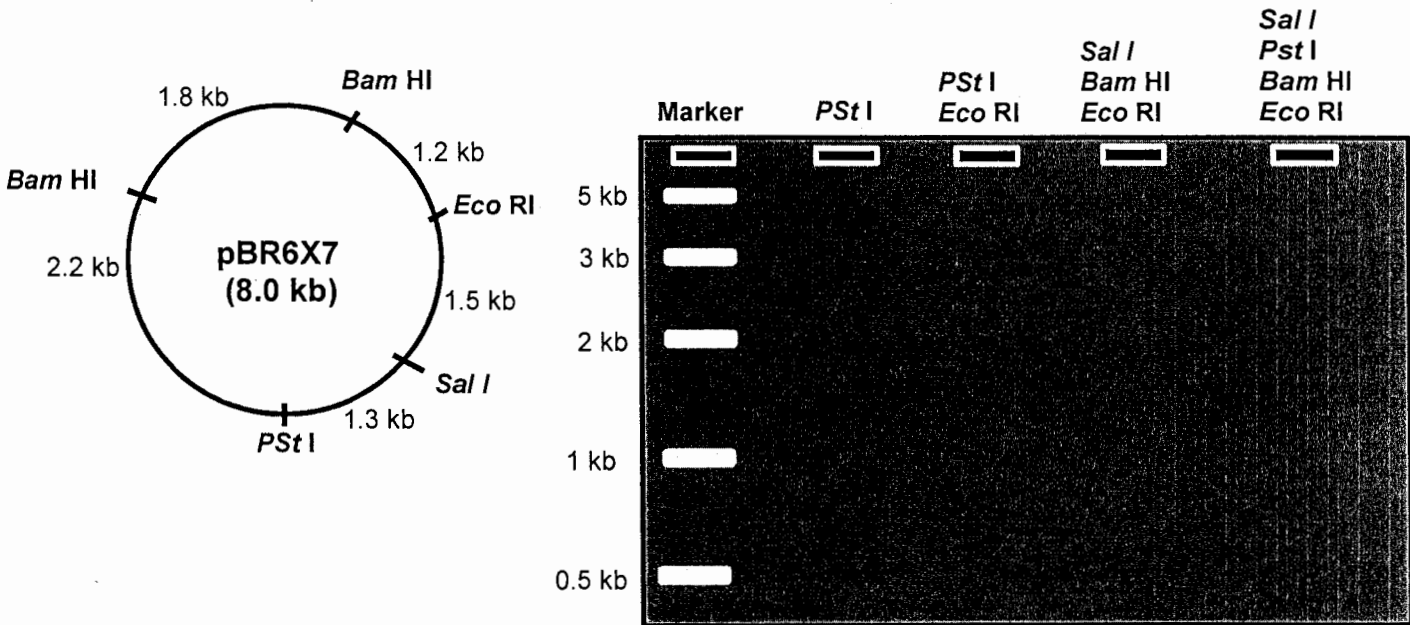
- PROGRAMMES:** B.Sc. III
B. Ed Secondary III
- COURSE CODE:** BIO341
- TITLE OF PAPER:** ADVANCED MOLECULAR BIOLOGY
- TIME ALLOWED:** THREE (3) HOURS
- INSTRUCTIONS:**
1. ANSWER QUESTION ONE (COMPULSORY) IN SECTION A AND ANY OTHER TWO QUESTIONS IN SECTION B
 2. QUESTION 1 CARRIES 50 MARKS AND EACH QUESTION IN SECTION B CARRIES 25 MARKS
 3. USE CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE.

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THE CHIEF INVIGILATOR

SECTION A [Compulsory]

Question 1

- (a) The restriction map of plasmid pBR6X7 is shown below. Indicate the position and size of DNA fragments following restriction digestion using a schematic diagram of a gel as indicated below. (10 marks)



- (b) Explain the construction of cDNA libraries. (10 marks)
- (c) Explain how Southern blotting is carried out. (14 marks)
- (d) Discuss the two life cycles of bacteriophages. (16 marks)

[Total = 50 marks]

SECTION B (Answer any two questions from this section)**Question 2**

- (a) Discuss the different types of gene mutations. (12 marks)
- (b) Explain how and why the Ames mutagenicity test is used on certain chemical substances. (13 marks)

[Total = 25 marks]**Question 3**

- (a) Explain why microsatellite markers are the most used DNA markers in human forensic analysis. (10 marks)
- (b) Briefly explain the application of the following and indicate the expected results:
- (i) AMEL marker (5 marks)
 - (ii) mitochondrial DNA markers (5 marks)
 - (iii) Y-STR markers (5 marks)

[Total = 25 marks]**Question 4**

Discuss the structure, molecular biology and pathogenesis of the human immunodeficiency virus (HIV). (25 marks)

[Total = 25 marks]**END OF EXAMINATION PAPER**