



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BTMB

ABT 4301: GENETIC ENGINEERING 1

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Dec 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

- a. Define the following terminologies;
- i. Transgenic animal (1 mark)
 - ii. Chaotropic agent (1 mark)
 - iii. Gene mapping (1 mark)
 - iv. Alleles (1 mark)
- b. Give the full meaning of the following abbreviations
- i. rDNA (½ marks)
 - ii. BSA (½ marks)
 - iii. dCTP (½ marks)
 - iv. X-gal (½ marks)
- c. Outline FOUR effects of MgCl₂ in polymerase chain reaction. (4 marks)
- d. Describe electroporation (4 marks)

- e. Contrast the structural and regulatory genes. (2 marks)
- f. The following were the results from a restriction enzyme (RE) digestion of a 50bp gene fragment. Deduce the restriction enzyme maps.
- Restriction digestion using RE1 produced 2 fragments, viz, 33bp and 17bp DNA fragment
 - Restriction digestion using RE2 produced 3 fragments, viz, 28bp, 12bp and 10bp DNA fragments
 - Double restriction digestion using RE1 and RE2 produced 4 fragments 28bp, 12bp, 5bp and 5bp DNA fragments.
- Use illustrations to deduce the restriction enzyme maps. (4 marks)
- g. Explain the principle of nucleic acid hybridization. (10 marks)

Question TWO

- a) Explain three factors to consider when selecting DNA polymerases for PCR (14 marks)
- b) Discuss the exploitation of recombinant DNA technology in forensic analysis. (6 marks)

Question THREE

Explain the exploitation of Southern blot hybridization to screen target gene in a DNA library.

Question FOUR

Describe the following solid-phase nucleic acid extraction methods.

- (i) Silica Matrices. (8 marks)
- (ii) Magnetic bead based nucleic acid purification. (12 marks)

Question FIVE

Describe the transcription and translation steps in gene expression. (20 marks)