



Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF PURE AND APPLIED SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
TECHNOLOGY IN INDUSTRIAL MICROBIOLOGY AND BIOTECHNOLOGY
BTMBT 11M

ABT 4301: GENETIC ENGINEERING I

SEMESTER EXAMINATION

DECEMBER 2013 SERIES

2 HOURS

Instructions to candidates:

This paper consist of **FIVE** questions

Answer question **ONE** (compulsory) and any other **TWO** questions

QUESTION ONE

a) Define the following terms

- (i) Sieving **(2marks)**
- (ii) *Chimera* DNA **(2marks)**
- (iii) Southern blot **(2marks)**

b) Name the most suitable type of electrophoresis for separation of each of the following macromolecules:

- (i) 20bp DNA **(1mark)**
- (ii) 70bp DNA **(1mark)**
- (iii) 100kDa protein **(1mark)**
- (iv) 50 kbp DNA **(1mark)**

- c) Name TWO reasons crude lysates, as source of DNA, are only appropriate for a limited range of applications **(4marks)**
- d) Name TWO types of cohesive ends **(2marks)**
- e) State the estimated activity of one unit of enzyme **(2marks)**
- f) List FIVE types of cloning vectors in order of the DNA size each can pack (Start with smallest) **(5marks)**
- g) State the TWO main reasons for amplifying DNA by PCR **(2marks)**
- h) State any THREE means of causing cell lysis and /or disruption to release DNA **(3marks)**
- i) Name TWO types of gene therapies **(2marks)**

QUESTION TWO

- a) Describe the classical procedure of gene cloning **(12marks)**
- b) Describe DNA isolation by salting out method **(8marks)**

QUESTION THREE

- a) Highlight the key characteristics of the main classes of restriction enzymes **(8marks)**
- b) Describe the principle of conventional and real-time PCR. **(12marks)**

QUESTION FOUR

- a) Describe the process of restriction mapping **(10marks)**
- b) Describe DNA splicing by addition of polymers **(10marks)**

QUESTION FIVE

- a) Explain what qualifies plasmids as cloning vectors **(12marks)**
- b) Describe ligase and its working conditions **(8marks)**