



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

**BACHELOR OF TECHNOLOGY IN INDUSTRIAL MICROBIOLOGY AND
BIOTECHNOLOGY**

Type unit code : ABT 4307: PROTEIN BIOTECHNOLOGY

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: 13 May 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of Choose No questions. Attempt Choose instruction.

Do not write on the question paper.

Question ONE

- a) Apart from *E. coli*, name other bacteria that are used as expression systems for proteins (4mks)
- b) Describe 2 ways of producing transgenic plants (4mks)
- c) Describe the function of the following recombinant proteins.
 - i) Hirudin (2 mks)
 - ii) Enkephalin (2 mks)
- d) Explain the function of the following protein based pharmaceuticals
 - i) Epidermal growth factor (2mks)
 - ii) Fibroblast growth factor (2mks)
 - iii) Superoxide dismutase (2mks)
 - iv) Erythropoietins (2mks)
- e) State six advantages of using *S. cerevisiae* compared to bacteria as a cloning host (6mks)

f) State factors to consider when choosing the right expression system for recombinant protein production (4mks)

Question TWO

Discuss the benefits and challenges associated with the production of heterologous proteins in milk of transgenic animals (20mks)

Question THREE

Describe the advantages and disadvantages of producing commercially important proteins in higher plants (20mks)

Question FOUR

Describe the following strategies used to improve the solubility of the expressed protein

- a) Reducing the rate of protein synthesis (10mks)
- b) Changing the growth medium (10mks)

Question FIVE

- a) Discuss the challenges associated with production of recombinant proteins in *Escherichia coli* (10mks)
- b) Describe the advantages of yeasts as expression systems for proteins (10mks)