



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BTMB

ABT 4304 : BIOREACTORS PAPER ONE

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

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) Compare the fluidized bed and fixed reactors (4 marks)
- b) State four objectives of an agitator (4 marks)
- c) Give the classifications of bioreactors (5marks)
- d) State any two assumptions for continuous operations (4 marks)
- e) Give the pros and cons of using continuous systems (5 marks)
- f) State the effects of the following factors in oxygen transfer
 - (i) Antifoaming agents (1 marks)
 - (ii) Pressure (1 marks)
 - (iii) Nutrient salts (1 marks)
 - (iv) Mixing (1 marks)
- g) Give the functions of the following parts in a bioreactor
 - (i) Valves (1 mark)
 - (ii) Compressor (1 mark)
 - (iii) Jacket (1 mark)
 - (iv) Mechanical seal (1 mark)

Question TWO

Discuss batch operations in bioreactors (20 marks)

Question THREE

Describe the following types of bioreactors

- (i) Fluidized Bed Bioreactors (10 marks)
- (ii) Packed Bed Bioreactors (10 marks)

Question FOUR

- (i) The antifoam requirement in a bioreactor depends on several factors. Discuss (12 marks)
- (ii) Explain the function of the agitation system in a stirred tank reactor (8 marks)

Question FIVE

- (i) Discuss factors affecting growth in bioreactor (14 marks)
- (ii) Describe flocculated cell reactors (6 marks)