

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR
OF SCIENCE IN BIOCHEMISTRY

BIOC 410: BIOTECHNOLOGY I

STREAMS: BSC (BIOCHEM) Y4S1

TIME: 2 HOURS

DAY/DATE: FRIDAY 07/12/2018

11.30 A.M. – 1.30 P.M.

INSTRUCTIONS:

- Answer question ONE and any other TWO questions
- Do not write on the question paper

QUESTION ONE (30 MARKS)

- (a) Outline how oxygen transfer rate of a reaction can be increased and maintained for smooth operation and better product output. [3 marks]
- (b) Outline the main functions of an impeller [3 marks]
- (c) State the main advantages of fed-batch over batch cultures [4 marks]
- (d) Murine monoclonal antibodies have both advantages and disadvantages. Justify this statement [4 marks]
- (e) Elucidate the different methods of bioreactor sterilization [4 marks]
- (f) State the disadvantages of using bacteria to produce single cell protein [3 marks]
- (g) Outline the uses of liquid-solid mass transfer [4 marks]
- (h) State the basic points of consideration while designing a fermenter [5 marks]

QUESTION TWO (20 MARKS)

- (a) Discuss the various stages of product recovery from fermenters [10 marks]

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- (b) Discuss bioreactor shape as one of the considerations that improve productivity of bioreactor [10 marks]

QUESTION THREE (20 MARKS)

- (a) Discuss batch cultivation as one of the main biotechnological processes for growing microorganisms in the bioreactor [10 marks]
- (b) Describe how human insulin is synthesized in *E.coli* [10 marks]

QUESTION FOUR (20 MARKS)

- (a) Discuss precautions that should be taken to avoid cross contamination when handling cell lines [7 marks]
- (b) Outline precautions that should be observed to avoid microbial contamination [3 marks]
- (c) Explain how one would micropropagate virus free plants [10 marks]
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