

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE
OF BACHELOR OF SCIENCE (BIOC)**

BIOC 414: BIOTECHNOLOGY II

STREAMS: BSC (BIO)

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 11/4/2018

8.30 A.M. – 10.30 A.M.

INSTRUCTION:

- **ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**
- **DO NOT WRITE ON THE QUESTION PAPER**

QUESTION ONE

- (a) Describe Transduction and Protoplasts fusion as means of traditional genetic manipulation methods of microorganisms for biotechnology applications. [7 marks]
- (b) Animal cell culture can be maintained for a very long time as a particular type of cell line and are suitable for scale-up studies. Unlike microbial cell cultures animals cell cultures have two unique features. Explain. [4 marks]
- (c) Explain air flow chamber class II (Class II LAFs) and inverted microscope as essential equipments for cell culture laboratory. [6 marks]
- (d) Describe the production of monoclonal antibodies as a biotechnological application. [7 marks]
- (e) Discuss cloning of a foreign gene of interest using a plasmid PUC18 as a cloning vector in E.coli using recombinant DNA technology. [6 marks]

QUESTION TWO

- (a) Discuss giving appropriate illustration hollow fiber perfusion bioreactor as scale-up of suspension cell culture process. [6 marks]
- (b) Monoclonal antibodies have enormous applications in diagnostic and therapeutic applications. Discuss giving examples for each of the two application. [14 marks]

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QUESTION THREE

- (a) Discuss screening of the recombinant bacterial cells as described in question (i.e.) above using the β -Galactosidase activity/blue-white screening strategy. [6 marks]
- (b) Discuss the production of recombinant factor VIII protein. [14 marks]

QUESTION FOUR

Discuss production of Transgenic plants as bioreactors (molecular farming) under the subheadings below. [20 marks]

- (i) Diagnostic and Therapeutic proteins
 - (ii) Edible vaccines
 - (iii) Biodegradable plastics
 - (iv) Metabolic engineering and secondary products
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