CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF

BACHELOR OF SCIENCE IN BIOCHEMISTRY

BIOC 230: FUNDAMENTALS OF BIOTECHNOLOGY

STREAMS: BSC (BIOC) Y2S2 **TIME: 2 HOURS**

DAY/DATE: THURSDAY 11/04/2019 **8.30 AM – 10.30 AM**

INSTRUCTIONS:

i **Answer question one and any other two questions**
ii **Do not write on the question paper**

QUESTION ONE (30 MARKS)

a Explain why direct conversion of a laboratory-scale process into an industrial process is not advisable if it has to be operated economically. (4 marks)

b Demonstrate how optimization of a bioreactor system can be attained. (4 marks)

c Explain how the efficiency of batch operation can be improved. (3

marks)

d Explain how optimal mass transfer can be attained in a bioreactor. (3 marks)

e Describe the basic steps involved in the process of recombinant DNA technology. (4 marks)

f Predict application of genetic engineering in the field of microbial technology. (4 marks)

g Show how different fermentation parameters affect downstream processing. (5 marks)

h Outline the main functions of an impeller. (3 marks)

QUESTION TWO (20 MARKS)

a Illustrate how living systems are organized at the genetic level. (10 marks)

b Describe the minimum components required in microbial medium for cultivation of microbes on industrial scale. (10 marks)

QUESTION THREE (20 MARKS)

a Critically evaluate continuous culture as a fermentation system. (10 marks)

b Design downstream processing procedure for a microbial product that is intracellularly produced. (10 marks)

QUESTION FOUR (20 MARKS)

a Demonstrate how hybridoma technology can be utilized in the production of monoclonal antibodies.

(10 marks)

b “Biotechnological approaches can reduce the use of toxic chemicals as pesticides and herbicides and thereby reduce environmental problems substantially”. Justify this statement.
(10 marks)
