

CHUKA UNIVERSITY

FIRST YEAR EXAMINATION BIOC 410: BIOTECHNOLOGY I

STREAM: Y4S1: BSc BIOCHEMISTRY

Instructions:

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

Question One (30 marks)

- a. State the main advantages of fed-batch over batch cultures (4 marks)
- b. State the four main types of agitator commonly used in the bioreactors (4 marks)
- c. What should be the basic points of consideration while designing a fermenter? *f* (5 marks)
- d. Murine monoclonal antibodies are both advantages and disadvantages. Justify this statement. (4 marks)
- e. Elucidate the different methods of bioreactor sterilization (4 marks)
- f. The function of the fermenter or bioreactor is to provide a suitable environment in which an organism can efficiently produce a target product. State target products that can be produced in a bioreactor (2 marks)
- g. State the disadvantages of using bacteria to produce single cell protein (3 marks)
- h. Outline the uses of liquid-solid mass transfer (4 marks)

Question Two (20 marks)

- a. Discuss the stages of downstream processing (10 marks)
- b. Discuss considerations that improve productivity of bioreactor (10 marks)

Question Three (20 marks)

- a. Discuss batch cultivation (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. Discuss the advantages of plant tissue culture (10 marks)