CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

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

BIOC 443: INTEGRATED LABORATORY TECHNIQUES III

STREAMS: **TIME: 2 HOURS**

DAY/DATE: TUESDAY 09/04/2024 **8.30 A.M. – 10.30 A.M.**

INSTRUCTIONS

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

Question one (30 marks)

a) Outline and four common properties shared by cloning vectors. (4 marks)

b) What are the advantages of using plasmid vectors over other cloning vectors? (5 marks)

c) Outline the key consideration while designing suitable primers for PCR. (5 marks)

d) Explain how one can optimize a PCR protocol in situations where there's no PCR product after implication. (6 marks)

e) Calculate the total number of cells suspended in a final volume of 5ml, taking into account that the cells were diluted 1:2 before counting and the number of cells with the haemocytometer was 400. (5 marks)

f) Describe how frozen stocks of cells can be revived. (5 marks)

Question two (20 marks)

Describe how cell harvesting can be achieved using:

a) Mechanical means (5 marks)

b) Proteolytic enzymes (15 marks)

Question three (20 marks)

a) Describe how isolation of DNA can be achieved using EDTA as the isolation buffer. (10 marks)

b) Describe the factors that determine the concentration, amount or activity of a given cell component that can be detected in the fluids of a healthy individual. (10 marks)

Question four (20 marks)

a) Describe the PCR procedure for amplification of DNA segment of interest. (10 marks)

b) Describe how DNA cloning is achieved using the cell based approach. (10 marks)

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