

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF
BACHELOR OF SCIENCE BIOCHEMISTRY**

BIOC 203: INTEGRATED LAB TECHNIQUES I

STREAMS: BSC (BIOCHEM) Y2S2

TIME: 2 HOURS

DAY/DATE: TUESDAY 02/08/2016

8.30 AM – 10.30 AM

INSTRUCTIONS:

- **Answer Question One and any other Two Questions**
- **Do not write on the question paper**

Question One (30 Marks)

- (a) Derive the Henderson-Hasselbach equation. [5 marks]
- (b) Define buffer capacity and provide its operational terms. [5 marks]
- (c) How many grams of acetic acid (CH_3CO_2H) and sodium acetate are needed to make up one liter of 50 mm acetate buffer with a pH of 5.0? [8 marks]
- (d) Explain the basic principle of chromatography. [4 marks]
- (e) Explain how gradient elution development is characterized. [8 marks]

Question Two (20 Marks)

- (a) Describe the principle behind ion-exchange chromatography. [10 marks]
- (b) Describe how ion exchange chromatography can be applied in separation of mixtures of adenine nucleotide. [5 marks]
- (c) Explain the difference between normal phase and reverse phase chromatography. [5 marks]

Question Three (20 Marks)

- (a) Explain how gel filtration can be used to separate proteins based on the molecular weight. [10 marks]
- (b) Describe how affinity columns for protein separation are prepared. [10 marks]

Question Four (20 Marks)

- (a) Explain how Geiger –Mueller counter is used to measure radio activity. [10 marks]
- (b) Describe how proteases can be used to achieve peptide mapping. [10 marks]
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