

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS
RESIT/SPECIAL EXAMINATION**

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE

CHEM 241: SEPARATION TECHNIQUES

STREAMS: BSC

TIME: 2 HOURS

DAY/DATE: THURSDAY 04/11/2021

8.30 A.M – 10.30 A.M.

INSTRUCTIONS:

- **Answer any Question ALL Questions.**

QUESTION ONE (30 MARKS)

- 1a (i) Suggest measures you would adopt to extend useful life of a column (4 marks)
- (ii) Discuss briefly the essential criteria for selection of suitable solvents for paper chromatography (5 marks)
- (iii) Outline the limitations of paper chromatography techniques (7 marks)
- (iv) Describe the separation principle in size exclusion chromatography (3 marks)
- (b)(i) Distinguish between isocratic and gradient elution (2 marks)
- (ii) Numerate the desirable features of a high performance liquid chromatography (5 marks)
- (iii) Explain why there is a need to use a guard column with analytical or preparative column while using HPLC (4 marks)

QUESTION TWO (20 MARKS)

- 2a Describe the principle of gas chromatography (10 marks)
- (b) (i) Explain the significance of temperature programming in gas liquid chromatography (4 marks)

(ii) State five criteria which must be used as guidelines in choosing a suitable derivation reagent for GC analysis (6 marks)

QUESTION THREE (20 MARKS)

3a (i) Draw phase diagram of CO₂ showing its supercritical properties (5 marks)

(ii) Discuss physical properties of supercritical fluids used in HPLC (11 marks)

(b) Outline the advantages of supercritical fluid chromatography over HPLC and GC (4 marks)
