



# MACHAKOS UNIVERSITY

University Examinations 2022/2023

SCHOOL OF EDUCATION

DEPARTMENT OF EARLY CHILDHOOD EDUCATION COMMUNICATION AND  
TECHNOLOGY

DEPARTMENT OF EARLY CHILDHOOD EDUCATION  
THIRD YEAR FIRST SEMESTER EXAMINATION FOR  
BACHELOR OF EDUCATION (SCIENCE)

ECT305: CHEMISTRY METHODS

DATE:

TIME:

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## INSTRUCTIONS

Answer Question ONE and ANY OTHER TWO.

1. (a) Explain how you would develop practical skills in a named chemistry topic, using the VEE-DIAGRAM. (10 marks)
- (b) Prepare an 80-minute Lesson Plan for a practical activity on test for Cations. In your lesson plan, assume that you will have access to:  
*Sodium Hydroxide solution; Ammonium Hydroxide Solution; Solutions containing: Sodium I Ions; Iron III Ions; Aluminium III Ions; Copper II Ions; Zinc II Ions; Lead II Ions.* (10 marks)
- (c) Prepare a table of expected observations and correct inferences for each of the Cations: *Iron III Ions; Aluminium III Ions; Copper II Ions; Zinc II Ions; Lead II Ions* in:
  - (i) *Sodium Hydroxide solution.* (5 marks)
  - (ii) *Ammonium Hydroxide Solution.* (5 marks)

2. (a) Explain and Illustrate the FIVE STEPS involved in the development of a balanced Test in Chemistry. (10 marks)
- (b) Explain the procedure, reagents, observations and inferences related to The Confirmatory Tests for the following Anions:
- (i)  $\text{SO}_4^{2-}$ ,  $\text{SO}_3^{2-}$  (4 marks)
  - (ii)  $\text{Cl}^-$  (3 marks)
  - (iii)  $\text{NO}_3^{1-}$  (3 marks)
3. (a) Explain and illustrate FIVE Practical Skills tested in each of the following areas of Chemistry Practical:
- (i) Volumetric Analysis. (5 marks)
  - (ii) Qualitative Analysis. (5 marks)
  - (iii) Enthalpy Change. (5 marks)
  - (iv) Rates of Reaction. (5 marks)
4. Select a topic from the Secondary School Chemistry Syllabus and explain how you would teach it using ONE of the following approaches: mention the key learning objectives; organization of learning activities; teaching aids and evaluation criteria for successful learning. (20 marks)
- (i) The Inquiry Based Learning.
  - (ii) The Project Method.
  - (iii) The Discussion Method.
  - (iv) Field Trip Method.
  - (v) The Learning Cycle.

5. Write a Critical Essay on ONE of the following aspects of CHEMISTRY. (20 marks)
- (i) Chemistry and industrial development in Kenya.
  - (ii) Chemistry and Career opportunities.
  - (iii) Chemistry and Medicine.
  - (iv) Project Work and the teaching of Chemistry.
  - (v) Chemistry and the National Congress for Science and Technology.