



REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARD

FOR

ANALYTICAL CHEMISTRY TECHNICIAN

KNQF LEVEL 6

OCCUPATION STANDARD ISCED CODE: 0531 554A

PERFORM INSTRUMENTAL ANALYSIS

ISCED UNIT CODE: 0531 551 13A

TVET CDACC UNIT CODE: ASC/OS/ACHEM/CR/03/6/MA

UNIT DESCRIPTION

This unit covers the competencies required in performing instrumental analysis. It involves performing colorimetric analysis, UV-Vis analysis, FT-IR analysis, AES analysis, AAS analysis and conductometric analysis

ELEMENT AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up laboratory function	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. <i>(Bold and italicized terms are elaborated in the Range)</i>
1. Perform Colorimetric analysis	1.1 Colorimetric equipment is set up as per chemistry laboratory manual. 1.2 Standard solutions are prepared as per chemistry laboratory manual. 1.3 Colorimeters are calibrated with standard solutions as per manufacturer instructions. 1.4 Sample solutions are prepared as per chemistry laboratory manual. 1.5 Sample solutions are run alongside standards. 1.6 Analytes concentrations are quantified as per colorimetric procedures.
2. Perform UV-VIS Analysis	2.1 UV-VIS spectrophotometer equipment is set up as per chemistry laboratory manual. 2.2 Reference solutions are prepared as per chemistry laboratory manual.

	<p>2.3 Spectrophotometers are calibrated as per manufacturers manual.</p> <p>2.4 Sample solutions are homogenized as per chemistry laboratory manual.</p> <p>2.5 Sample solutions maximum absorption wavelength is obtained as per chemistry laboratory manual.</p> <p>2.6 Analyte concentrations are quantified from the calibration curves as per spectrophotometric procedures.</p>
3. Perform FT-IR Analysis	<p>3.1 FT-IR equipment is set up as per chemistry laboratory manual.</p> <p>3.2 Reference solutions are prepared as per chemistry laboratory manual.</p> <p>3.3 FT-IR Spectrophotometers are calibrated as per manufacturers manual.</p> <p>3.4 Sample solutions are analyzed as per FT-IR spectroscopic procedures.</p> <p>3.5 Unknown functional groups are identified from spectral peaks as per spectroscopic reference charts</p>
4. Conduct AES analysis	<p>4.1 AES instrument is set up as per laboratory manual.</p> <p>4.2 Instrument is calibrated using standard solutions as per laboratory manual.</p> <p>4.3 Sample solutions are prepared as per chemistry laboratory procedures.</p> <p>4.4 Samples are analyzed as per AES procedures.</p> <p>4.5 Unknown concentrations are determined from the calibration curves as per spectrophotometric procedures.</p>
5. Perform AAS analysis	<p>5.1 AAS spectrophotometer equipment is set up as per manufacturer's manual.</p>

	<p>5.2 Standard solutions are prepared as per chemistry laboratory manual.</p> <p>5.3 AAS Spectrophotometer is calibrated as per chemistry laboratory manual.</p> <p>5.4 Sample solutions are homogenized as per spectrophotometric procedures.</p> <p>5.5 Sample solutions are analyzed as per spectrophotometric procedures.</p> <p>5.6 Unknown concentrations are calculated from the calibration graph as per spectrophotometric procedures.</p>
<p>6. Conduct Conductometric analysis</p>	<p>6.1 Apparatus and equipment are set up as per chemistry laboratory manual.</p> <p>6.2 Conductometric equipment is calibrated as per manufacturers manual.</p> <p>6.3 Sample solutions are prepared as per chemistry laboratory manual.</p> <p>6.4 Buffer solutions are prepared as per chemistry laboratory manual.</p> <p>6.5 Sample solutions are analyzed as per conductometric procedures.</p> <p>6.6 Unknown concentrations are calculated from conductometric formulae as per conductometric procedures.</p>

RANGE

This section provides a work environment and conditions to which the performance criteria apply. It allows for a different work environment and situations that will affect performance.

Variable	Range
1. Standard solutions	<ul style="list-style-type: none">• Buffer solutions• Working standards.• Stock solutions

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Communication skills
- Taking measurements
- Computer skills
- Diagnosing animal diseases

Required Knowledge

The individual needs to demonstrate knowledge of:

- Preparation of solution
- Preparation of samples
- Relevant equipment operation

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Calibrated chemistry laboratory equipment as per the manufacture's instruction. 1.2 Calculated analyte concentrations as per spectroscopic procedures. 1.3 Identified unknown functional groups as per FT-IR spectroscopic reference chart' 1.4 Prepared buffer solution as per chemistry laboratory manual.
2. Resource Implications	The following resources should be provided: 2.4 Access to relevant workplace 2.5 Appropriately simulated environment where assessment can take place 2.6 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Practical test 3.2 Written test 3.3 Third party report
4. Context of Assessment	Competency may be assessed: 4.1 Workplace 4.2 Simulated laboratory environment

5. Guidance information for assessment

5.1 Holistic assessment with other units relevant to the industry sector, laboratory and job role is recommended.