



REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARD

FOR

ANALYTICAL CHEMISTRY TECHNICIAN

KNQF LEVEL 6

OCCUPATION STANDARD ISCED CODE: 0531 554A

PERFORM INDUSTRIAL CHEMISTRY ANALYSIS

ISCED UNIT CODE: 0531 551 17A

TVET CDACC UNIT CODE: ASC/OS/ACHEM/CR/08/6/MA

UNIT DESCRIPTION

This unit covers the competencies required in performing industrial chemistry. It involves performing water and waste water analysis, carrying out soap and detergents analysis, performing agrochemical analysis, petroleum analysis, cement analysis, sugar and allied analysis and pulp analysis.

ELEMENT AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the key outcomes which make up laboratory function	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 water and waste water analysis	1.1 Water samples are obtained as per chemistry laboratory manual. 1.2 <i>Water biological parameters</i> are measured as per chemistry laboratory manual. 1.3 <i>Water physical parameters</i> are measured as per chemistry laboratory manual. 1.4 <i>Water chemical parameters</i> are measured as per chemistry laboratory manual.
2. Carry out soap and detergents analysis	2.1 Free Fatty acid is tested as per laboratory manual. 2.2 Acid value test is carried out as per laboratory manual. 2.3 Moisture content is tested as per laboratory manual. 2.4 Foam stability is tested as per laboratory manual.

	<p>2.5 Hardness is tested as per laboratory manual.</p> <p>2.6 Saponification values are calculated as per laboratory manual.</p>
3. Perform agrochemical analysis	<p>3.1 Solubility tests is carried out as per laboratory manual.</p> <p>3.2 Vapor pressure test is carried out as per laboratory manual.</p> <p>3.3 Photo stability test is performed as per laboratory manual.</p> <p>3.4 Shelf- life Stability test is carried out as per laboratory manual.</p>
4. Perform petroleum analysis	<p>4.1 Octane number is calculated as per laboratory manual.</p> <p>4.2 Cetane number is calculated as per laboratory manual.</p> <p>4.3 Flash point is determined as per laboratory manual.</p> <p>4.4 Specific gravity is measured as per laboratory manual.</p>
5. Perform cement analysis	<p>5.1 Finess test is carried out as per laboratory manual.</p> <p>5.2 Setting time is determined as per laboratory manual.</p> <p>5.3 Unsoundness is tested as per laboratory manual.</p>
6. Perform sugar and allied analysis	<p>6.1 Brix test is measured as per laboratory manual.</p> <p>6.2 Crystal size is determined as per laboratory manual.</p> <p>6.3 Moisture content is tested as per laboratory manual.</p> <p>6.4 Color is tested as per laboratory manual.</p>
7. Perform paper and allied analysis	<p>7.1 Estimation of copper number is calculated as per laboratory manual.</p>

	<p>7.2 Estimation of kappa number is calculated as per laboratory manual.</p> <p>7.3 Viscosity is tested as per laboratory manual.</p> <p>7.4 Starch is tested as per laboratory manual.</p>
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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. Water biological parameters	<ul style="list-style-type: none"> • Nutrients • Bacteria • Algae • Protozoa • Virus
2. Water physical parameters	<ul style="list-style-type: none"> • Turbidity • Odor • Density • Taste • Temperature • Color • Electric conductivity
3. Water chemical parameters	<ul style="list-style-type: none"> • pH • Dissolved oxygen • Hardness • Biological oxygen demand • Total soluble solids • Total dissolved solids • Chemical oxygen demand

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:

- Data interpretation skills
- Problem solving skills
- Proficiency in relevant software
- Safety precautions skills
- Laboratory skills
- Time management
- Report writing skills
- First aid
- Report writing

Required Knowledge

The individual needs to demonstrate knowledge of:

- Decision making
- Report writing
- Data interpretation
- Proficient in ICT
- Time management
- Problem solving
- Negotiation

EVIDENCE GUIDE

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

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ol style="list-style-type: none">1.1 Obtained samples as per chemistry laboratory manual.1.2 Measured water biological parameters as per chemistry laboratory manual.1.3 Measured water physiochemical parameters as per chemistry laboratory manual.1.4 Tested free fatty acid as per laboratory manual.1.5 Carried out acid value test as per laboratory manual.1.6 Tested moisture content as per laboratory manual.1.7 Tested foam stability as per laboratory manual.1.8 Tested hardness as per laboratory manual.1.9 Calculated saponification values as per laboratory manual.1.10 Carried out solubility tests as per laboratory manual.1.11 Carried out vapor pressure test as per laboratory manual.1.12 Performed photostability test as per laboratory manual.1.13 Calculated octane number as per laboratory manual.1.14 Determined flash point as per laboratory manual.1.15 Carried out finesse test as per laboratory manual.1.16 Determined setting time as per laboratory manual.1.17 Measured brix test as per laboratory manual.1.18 Calculated copper number estimate as per laboratory manual.
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	<p>1.19 Calculated kappa number estimate as per laboratory manual.</p> <p>1.20 Tested starch as per laboratory manual.</p>
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Access to relevant workplace</p> <p>2.2 Appropriately simulated environment where assessment can take place</p> <p>2.3 Materials relevant to the proposed activity or tasks</p>
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <p>3.1 Written</p> <p>3.2 Practical</p> <p>3.3 Third party report</p> <p>3.4 Case study</p>
4. Context of Assessment	<p>Competency may be assessed:</p> <p>4.1 Workplace or simulated laboratory environment</p>
5. Guidance information for assessment	<p>5.1 Holistic assessment with other units relevant to the industry sector, laboratory and job role is recommended.</p>