

PERFORM CHEMISTRY TECHNIQUES

UNIT CODE: 0531 441 10A

TVET CDACC UNIT CODE: SLT/OS/SL/CR/04/5/MA

UNIT DESCRIPTION

This unit specifies the competencies required to perform chemistry techniques. It involves carrying out pH measurements, analyzing chemical samples and carrying out separation techniques.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the key outcomes which make up workplace function (to be stated in active)	These are assessable statements which specify the required level of performance for each of the elements (to be stated in passive voice) <i>Bold and italicized terms are elaborated in the Range</i>
1 Carry out pH measurement	1.1 <i>pH apparatus</i> and <i>equipment</i> are assembled as per work requirement 1.2 <i>Sample pH measurement</i> is performed as per chemistry laboratory manual 1.3 Sample pH result is reported as per chemistry laboratory manual
2 Analyze chemical sample	2.1 <i>Chemical analysis apparatus</i> and <i>equipment</i> are assembled as per work requirement 2.2 <i>Chemical samples</i> and <i>reagents</i> are prepared as per chemistry laboratory manual 2.3 <i>Chemical analysis</i> is performed as per chemistry laboratory manual 2.4 Chemical analysis results are reported as per chemistry laboratory manual
3 Carry out separation technique	3.1 <i>Separation technique apparatus</i> and <i>equipment</i> are assembled as per work requirement

	<p>3.2 Chemical sample and <i>separation reagent</i> is prepared as per work requirement</p> <p>3.3 <i>Sample separation</i> is performed as per chemistry laboratory manual</p> <p>3.4 Separation result is reported as per chemistry laboratory manual</p>
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RANGE

This section provides work environments and conditions to which the performance criteria apply.

It allows for different work environments and situations that will affect performance.

VARIABLE	RANGE
1. pH apparatus includes but not limited to:	<ul style="list-style-type: none"> • Indicator papers • Glassware
2. pH reagents include but not limited to:	<ul style="list-style-type: none"> • Distilled water • pH indicator solutions • Organic solvents • Inorganic solvents
3. Sample pH measurement includes but not limited to:	<ul style="list-style-type: none"> • pH indicator solution • pH indicator paper • pH meter

4. Chemical analysis apparatus includes but not limited to:	<ul style="list-style-type: none"> • Glassware • Hot plates • Burettes • Pipettes • Magnetic stirrer plates • Bunsen burners • Spatulas • Crucibles • Tripod stand • Clamp and stand • Test tube racks • Tongs
5. Chemical analysis equipment includes but not limited to:	<ul style="list-style-type: none"> • Analytical balances • Ovens • Karl Fischer titrators
6. Chemical samples include but not limited to:	<ul style="list-style-type: none"> • Alcoholic beverages • Food substances • Petroleum products • Soil • Gases • Metal ores • Mineral salts
7. Chemical reagents include but not limited to:	<ul style="list-style-type: none"> • Organic acids • Inorganic acids • Organic bases • Inorganic bases • Polar solvents • Non-polar solvents

8. Chemical analysis includes but not limited to:	<ul style="list-style-type: none"> • Volumetric • Gravimetric • Flame photometry • Colorimetry
9. Separation technique apparatus include but not limited to:	<ul style="list-style-type: none"> • Glassware • Pestle and mortar • Water bath • Separating funnel • Hot plates • Magnetic stirrer plates • Bunsen burners • Spatula • Crucibles • Tripod stand • Filter paper • Clamp and stand • Chromatography paper • Thin layer chromatography development chamber • Tongs
10. Separation technique equipment include but not limited to:	<ul style="list-style-type: none"> • Distillation apparatus • Soxhlet apparatus • Analytical balance • Oven • Furnace • Fridge

11. Separation reagent includes but not limited to:	<ul style="list-style-type: none"> • Organic solvents • Distilled water • Inorganic solvents
12. Sample separation include but not limited to:	<ul style="list-style-type: none"> • Distillation • Evaporation • Paper chromatography • Decantation • Extraction • Filtration • Crystallization

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
- Analytical
- Computer
- Maintenance
- Problem solving
- Technical
- Calibration
- Critical thinking
- Observation
- Interpretation
- Sample handling

Required Knowledge

The individual needs to demonstrate knowledge of:

- Qualitative and quantitative analysis
- Sample preparation and storage
- Operation of laboratory equipment
- Laboratory ware and equipment
- Laboratory safety

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	1.1 Assessment requires evidence that the candidate: 1.2 Performed sample pH measurement as per chemistry laboratory manual 1.3 Reported sample pH result as per chemistry laboratory manual 1.4 Prepared chemical samples and reagents as per chemistry laboratory manual 1.5 Performed chemical analysis as per chemistry laboratory manual 1.6 Chemical analysis results are reported as per chemistry laboratory manual 1.7 Prepared chemical sample and separation reagent as per work requirement 1.8 Performed sample separation as per chemistry laboratory manual 1.9 Separation result is reported as per chemistry laboratory manual
2 Resource Implications	2.1 The following resources should be provided: 2.2 Appropriately simulated environment where assessment can take place. 2.3 Access to relevant work environment. 2.4 Resources relevant to the proposed activities or tasks.
3 Methods of Assessment	Competency in this unit may be assessed through:

	3.1 Practical 3.2 Project 3.3 Third party report 3.4 Portfolio of evidence 3.5 Written test 3.6 Oral test
4 Context of Assessment	Competency may be assessed in a work place or simulated workplace
5 Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.