



REPUBLIC OF KENYA

COMPETENCY BASED MODULAR CURRICULUM

FOR

ANALYTICAL CHEMISTRY TECHNOLOGY

KNQF LEVEL 6

(CYCLE 3) PROGRAMME ISCED CODE: 0531 554A



TVET CDACC
P.O. BOX 15745-00100 NAIROBI

CHEMICAL SEPARATION

ISCED UNIT CODE: 0531 551 02A

TVET CDACC UNIT CODE: ASC/CU/ACHEM/CR/05/6/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Perform Chemical Separation

Duration: 200 Hours

Unit Description

This unit covers the competencies required in performing chemical separation. It involves carrying out extraction, filtration, distillation and chromatography.

Summary of Learning Outcomes

S/No	Learning Outcomes	Duration (Hours)
1.	Carry out Extraction	60
2.	Carry out Filtration	30
3.	Carry out distillation	40
4.	Carry out chromatography	70
Total		200

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. To carry out Extraction	1.1 Set up apparatus and equipment 1.1.1 Separating Funnel 1.1.2 Soxhlet apparatus	<ul style="list-style-type: none">• Practical Assessment

	<p>1.1.3 Distillation apparatus</p> <p>1.1.4 Water bath</p> <p>1.1.5 Heating mantle</p> <p>1.1.6 TLC plates</p> <p>1.2 Prepare extraction solvents</p> <p>1.2.1 Ethanol</p> <p>1.2.2 Chloroform</p> <p>1.2.3 Acetone</p> <p>1.2.4 Diethyl ether</p> <p>1.3 Extract analytes</p> <p>1.4 Test analytes</p>	<ul style="list-style-type: none"> • Project-Based Assessment • Portfolio of Evidence • Written Assessment
2 To carry out Filtration	<p>2.1 Set up apparatus and equipment</p> <p>2.2 Sample preparation</p> <p>2.3 Filter analytes</p> <p>2.4 Test filtered analytes</p>	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment Third party reports
3 To carry out distillation	<p>3.1 Set up apparatus and equipment</p> <p>3.2 Sample preparation</p> <p>3.3 Distil analyte's</p> <p>3.4 Test distillates</p>	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment

4 To carry out Chromatography	4.1 Set up chromatography apparatus and equipment 1.1.1 Paper Chromatography 1.1.2 Thin layer Chromatography 1.1.3 High Performance Chromatography 1.1.4 Gas Chromatography 4.2 Sample preparation 4.3 Separate analytes 4.4 Test analytes	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment
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Suggested Methods of Instruction

1. Practical
2. Projects
3. Demonstrations
4. Group discussion
5. Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	Learning Materials			
1.	Power point presentations	For trainer's use	1	1:25
2.	Desktop computer/laptop	For trainer's use	1	1:25
3.	Projector	For trainer's use	1	1:25
4.	Standard manuals/SOPs	For trainer's use	1	1:25
5.	Flip charts	For trainer's use	1	1:25
6.	Whiteboard	For trainer's use	1	1:25
7.	Assorted reference materials	For trainer's and trainee use	5	5:25
B	Learning Facilities & infrastructure			

1.	Lecture/theory room	For trainer's and trainee use	1	1:25
2.	standard Science laboratory	For trainee use	1	1:25
3.	Internet connection	For trainee use	Enough	
4.	Assorted analytical instruments	For trainer's and trainee use	1	1:25
C	Consumable materials			
1.	Stationeries	For trainee use	25	1:1
2.	Gloves	For trainee use	25	1:1
3.	Laboratory coats	For trainee use	25	1:1
4.	Masks	For trainee use	25	1:1
5.	Covers slips	For trainee use	5	1:5
6.	Assorted whiteboard markers	For trainer's	enough	
7.	Assorted Glassware	For trainee use	enough	1:1
8.	Assorted equipment	For trainee use	enough	1:5
9.	Pestle and mortars	For trainee use	12	1:2
10.	Droppers/teat pipettes	For trainee use	25	1:1
11.	Assorted chemicals [acids, bases, solvents, salts]	For trainee use	enough	1:1
12.	Calibration standards	For trainer and trainee use	enough	1:1
D	Tools and Equipment			
1.	Analytical balances	For trainee use	5	1:5
2.	First aid kit	For trainee use	5	1:25
3.	Muffle Furnace	For trainee use	1	1:25
4.	oven	For trainee use	2	1:12
5.	centrifuges	For trainee use	4	1:6
6.	refrigerator/freezer	For trainee use	1	1:25
7.	Water bath	For trainee use	3	1:8
8.	hot plate	For trainee use	6	1:4
9.	Extraction apparatus [Soxhlet extractor]	For trainer and trainee use	5	1:5
10.	Filtration apparatus [filter funnels, conical flasks, Buchner funnel, Buchner flask, suction pump]	For trainer and trainee use	1	1:25
11.	Distillation apparatus [distillation flask, distillation column, condenser and collection flask]	For trainer and trainee use	1	1:25
12.	Chromatography apparatus [solvent reservoir, Injector system, columns, TLCs,]	For trainer and trainee use	1	1:25
13.	Sample storage apparatus	For trainee use	25	1:1

