

DAIRY CHEMISTRY PRINCIPLES

ISCED UNIT CODE: 0721 451 06A

TVET CDACC UNIT CODE: DA/CU/PM/CC/02/5/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply Dairy Chemistry Principles

Duration of Unit: 120 Hours

Unit Description

This unit specifies the competencies required by a Dairy Plant Technician level 6 to Apply Dairy Chemistry Principles. It involves applying physical chemistry principles, applying inorganic chemistry concepts and applying organic chemistry concepts

Summary of Learning Outcomes

By the end of this unit, the learner should be able to:

S/No	Learning Outcomes	Duration (Hours)
1.	Apply physical properties	40
2.	Apply chemical properties	40
3.	Apply functional properties	40
Total		120

Learning Outcomes, Content, and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. Apply physical chemistry principles	1.1 Acid and bases 1.1.1 Definition of terms 1.1.2 Properties of Acids and bases 1.2 Salts 1.2.1 Classification of salts 1.2.2 Properties of salts 1.3 Mole concept 1.3.1 Chemical Equations 1.3.2 Stoichiometry 1.3.2.1 Definition of Terms	<ul style="list-style-type: none">• Written tests• Interviews/ Oral questions• Practical• Individual/group assignments• Case Studies• Third party report

	<p>1.3.2.2 Balancing of chemical equations</p> <p>1.3.2.3 Ionic Equations</p> <p>1.4 Reaction Kinetics</p> <p>1.4.1 Order of reaction and molecularity</p> <p>1.4.2 Variation of rates of concentrates</p> <p>1.4.3 Collision theory</p> <p>1.4.4 Catalysts and activation energy</p> <p>1.4.5 Choir reactions</p> <p>1.5 Gas Properties</p> <p>1.5.1 Definitions</p> <p>1.5.2 Kinetic theory</p> <p>1.5.3 Gas laws</p> <p>1.5.3.1 Boyles law</p> <p>1.5.3.2 Charles Law</p> <p>1.5.3.3 Avogadro's law</p> <p>1.5.3.4 Gay lussacs law</p>	
2. Apply inorganic chemistry concepts	<p>2.1 Matter</p> <p>2.1.1 Definitions</p> <p>2.1.2 Properties of matter</p> <p>2.1.3 States of matter</p> <p>2.1.4 Separation of mixtures</p> <p>2.2 Elements of the periodic table</p> <p>2.2.1 Atomic structure</p> <p>2.2.2 Physical and chemical properties of elements</p> <p>2.2.2.1 Ions</p> <p>2.2.2.2 Molecules</p> <p>2.2.2.3 Compounds</p> <p>2.2.3 Mass Spectroscopy</p> <p>2.3 Structure and Bonding</p> <p>2.3.1 Definition of terms</p> <p>2.3.2 Types of Bonds</p> <p>2.3.2.1 Ionic Bond</p> <p>2.3.2.2 Ionic bond</p> <p>2.3.2.3 Covalent bonds</p> <p>2.3.2.4 Van der Waals bond</p> <p>2.3.2.5 Hydrogen bond</p> <p>2.3.3 Structure of inorganic Compounds</p> <p>2.3.3.1 Giant Ionic lattice</p> <p>2.3.3.2 Molecular Covalent</p> <p>2.3.3.3 Metallic Lattice</p>	<ul style="list-style-type: none"> • Written tests • Interviews/ Oral questions • Practical • Individual/group assignments • Case Studies • Third party report

	2.3.3.4 Giant Covalent	
3. Apply organic chemistry principles	3.1 Concepts of organic chemistry <ul style="list-style-type: none"> 3.1.1 Definition of terms 3.1.2 Classification of organic compound <ul style="list-style-type: none"> 3.1.2.1 Hydrocarbons 3.1.2.2 Organic acids 3.1.2.3 Alcohols 3.1.2.4 Esters 3.1.2.5 Ethers 3.1.2.6 Amines 3.2 Physical Properties of Organic compounds <ul style="list-style-type: none"> 3.2.1 Colour 3.2.2 Odour 3.2.3 Mass 3.2.4 Solubility 3.2.5 Density 3.2.6 Melting point 3.3 Chemical properties organic compounds <ul style="list-style-type: none"> 3.3.1 pH 3.3.2 Chemical stability 3.3.3 Radioactivity 3.3.4 Flammability 3.3.5 Heat of combustion 	<ul style="list-style-type: none"> • Written tests • Interviews/ Oral questions • Practical • Individual/group assignments • Case Studies Third party report

Suggested Methods of Instruction

- Demonstrations
- Group discussion
- Direct instruction
- Role play

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	Learning Materials			
1.	Textbooks		5 pcs	1:5
2.	Production Manuals		5	1;5
3.	PowerPoint presentations	For trainer's use		
4.	Projector		1	1;25

5.	Assorted Flash Cards		5	1;5
6.	Whiteboard		1	1;25
7.	Rolls flip charts		1	1;25
8.	Assorted colour of whiteboard markers	For trainers Use		
B	Learning Facilities & infrastructure			
1.	Lecture/theory room		1	1:25
2.	Workshop		1	1:25
3.	Laboratory		1	1:25
4.	Site/industry		1	1:25
C	Consumable materials			
1.	Alcohol		1ltr	1:5
2.	Sodium		2gs	2:5
3.	Potassium		2gs	2;5
4.	Bases		15mls	15;5
5.	Iodine		10 mls	10;5
6.	Milk /product samples		500ml	500mls:5
7.	Esters		20mls	20;5
D	Tools and Equipment			
1.	Source of heat		5 pcs	1:5
2.	Burettes		1 pcs	1:25
3.	Pipettes		1 pcs	1:25
4.	Conical flask		5 pcs	1:5
5.	Volumetric flasks		5pcs	5:5
6.	Measuring cylinders		1 pcs	1:25
7.	Test tubes		10 pcs	10:5
8.	Test-tube holder		5pcs	1:5
9.	Filter papers		10	