higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 3

8 November 2022

This marking guideline consists of 5 pages.

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QUESTION 1: FERTILISERS

1.1 1.1.1 False
1.1.2 True
1.1.3 True
1.1.4 True
1.1.5 False

(5 × 1) (5)

1.2 Disadvantages of inorganic fertilisers:

- They are more expensive.
- They can be used in too big quantities.
- They can pollute bodies of water.
- They may cause problems with moisture retention.
- Farmland needs to be fertilised because of the speed at which inorganic fertilisers are used up.
- Sometimes nutrients in inorganic fertilisers cannot be effectively absorbed by plant roots.
- They can prevent microbial life in soil.
- The effects of soil erosion are not minimised when inorganic fertiliser is used.

(Any 5 × 1) (5)

1.3 1.3.1 $MgSO_4$ ✓✓

1.3.2 $(NH_4)_2SO_4$ ✓✓

1.3.3 NH_2CONH_2 ✓✓

(3 × 2) (6)

1.4 Potassium or K (1)

1.5 Pure apatite is not useful as a fertiliser because it does dissolve in water.✓✓ (2)

1.6 1.6.1

- Vaporisation
- Cleaning
- Preheating
- Mixing and reaction

(4)

1.6.2 $4\ NH_3 + 5\ O_2 \longrightarrow 4\ NO + 6\ H_2O$
✓ ✓ ✓ ✓ (4)

1.6.3 Nitrogen oxide (1)

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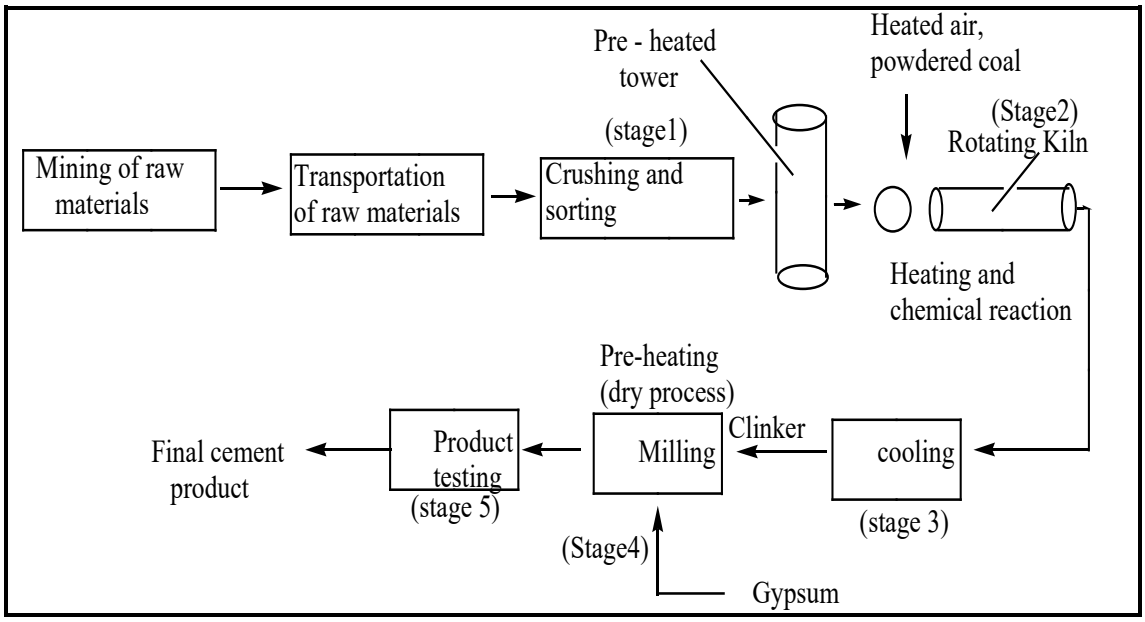
QUESTION 2: CEMENT, CALCIUM AND SODIUM COMPOUNDS

2.1
- It has high strength when it is dry.
- It is fire resistant.
- It is durable.
- It can be moulded into any shape. (Any 3 × 1) (3)

2.2
- Afrisam
- Lafarge
- Natal Portland Cement
- Pretoria Portland Cement
- Sephaku Cement (5)

2.3



Any 7 marks for correct labelling (7)

2.4 Limestone makes up about 80% of all the raw material used in the cement.✓
It adds strength to the cement due to its calcium carbonate content.✓ (2)

2.5 Stage 1: raw material preparation
Stage 2: clinkering
Stage 3: cooling
Stage 4: cement milling
Stage 5: product testing (5)

2.6 2.6.1 $CaCO_3$
- In the pulp and paper industry, it is used to improve the printing properties of paper.
- In the plastic industry, it is used as a filler to replace a more expensive material when plastic is made.
- In the paint industry, it is an extender.
- In the agricultural industry, it is used as a fertiliser.
- In the cement production process, it is used as a raw material.

(Any 3 × 1)

2.6.2 CaO

- It is used as a bleaching agent.
- In the building industry, it is used to whitewash walls.
- In the paper industry, it is used to whiten paper.
- In the metal industry, it is used in the manufacture of metal alloys.
- It is used to purify water.
- It is used to remove impurities like phosphate from sewage.

(Any 3 × 1)

2.6.3 $CaSO_4$

- It is used in the production of sulphuric acid and cement.
- In the paint industry, it is used as a pigment extender.

(3 × 3) (9)

2.7 Sodium chloride or NaCl (1)

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QUESTION 3: SOAP, DETERGENTS AND PESTICIDES

3.1
- Soap bars
- Liquid soap
- Washing powder
- Shampoo
- Dishwashing liquids and powder (Any 3 × 1) (3)

3.2 3.2.1 Hydrophobic:✓ it consists of straight hydrocarbons.✓

3.2.2 Hydrophobic:✓ it consists of branched hydrocarbons.✓

3.2.3 Hydrophilic:✓ it contains an anionic group.✓

(3 × 2) (6)

3.3 Cationic and anionic hydrophiles cannot be used together in a detergent because they will form an insoluble solid, making the detergent useless. (2)

3.4
- Boiling
- Salting
- Strong change
- Pitching (4)

3.5
- Insecticides
- Herbicides
- Fungicides (3)

3.6 Selective herbicides only kill certain types of plants like weeds,✓ whereas non-selective herbicides kill all types of plants.✓ (2)

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QUESTION 4: PULP AND PAPER

4.1
- Virgin fibre is obtained directly from plants, OR it is a fibre that has never been used before in the manufacture of paper or other products.
- Secondary fibre is fibre obtained from waste paper. (2)

4.2
- Mechanical pulping
- Chemical pulping (2)

4.3
- Conduction drying
- Convection drying (air drying)
- Radiant drying (3)

4.4 4.4.1 Roll structure:✓ it refers to how tightly the rolls are wound.✓
Web control:✓ it refers to keeping the web from wandering.✓ (4)

4.4.2
- Supercalendering
- Coating
- Embossing
- Laminating (4)

4.4.3
- Sandpaper
- Carbon tissue
- Photographic paper
- Wallpaper
- Conductive paper (5)

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TOTAL: 100

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