higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 3

(6050433)

17 November 2023 (X-paper)
09:00–12:00

This question paper consists of 5 pages.

151Q1N2317

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
PROCESS CHEMISTRY
NQF LEVEL 3
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use only a black or blue pen.
5. Write neatly and legibly.

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QUESTION 1: FERTILISERS

1.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 Fertilisers are substances that are added to soil to make it less fertile.

1.1.2 Crops are plants that are grown on a farm or plantation to produce food for people and animals.

1.1.3 Arable land is land that is suitable to be farmed.

1.1.4 Inorganic fertilisers may cause problems with moisture retention.

1.1.5 Guano is not suitable to be used as fertiliser, as it is excrement from birds.

(5 × 1) (5)

1.2 List FOUR advantages of inorganic fertilisers. (4)

1.3 Name FOUR examples of nitrogen fertilisers. (4)

1.4 Name FIVE industrial manufacturers of fertilisers in South Africa. (5)

1.5 Foliar fertiliser is much more efficient than other forms of fertilisation.

Explain the statement. (3)

1.6 Name ONE main problem associated with the use of foliar fertilisers. (1)

1.7 Name THREE minerals from which sulphuric acid is obtained. (3)

1.8 The wet process can be used in the production of phosphoric acid.

1.8.1 List FOUR stages in sequence involved in the wet process for the production of phosphoric acid. (4)

1.8.2 Write the chemical formula of gypsum. (2)

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QUESTION 2: CEMENT, CALCIUM AND SODIUM COMPOUNDS

2.1 The raw materials for cement production are made up of two types of rock.

2.1.1 Name the TWO types of rock.

2.1.2 Differentiate between the TWO types of rock named in QUESTION 2.1.1 above.

(2 × 2) (4)

2.2 Which substance is used to add strength in cement? Write its chemical formula. (1)

2.3 Name the stages involved in a slagment production process in sequence. (5)

2.4 Iron ore exists as iron oxides together with silicates and other metal oxides.

Name and write the chemical formula of THREE most common iron oxides found. (6)

2.5 Calcium hydroxide is commonly known as “slaked lime” in industry.

2.5.1 Write the chemical formula of slaked lime. (1)

2.5.2 List THREE industrial applications of slaked lime. (3)

2.6 Sodium carbonate is a white solid and a strong alkali, and it is one the most-used chemicals in the world.

2.6.1 Write the molecular formula of sodium carbonate.

2.6.2 What is the common name of sodium carbonate?

2.6.3 Name the most common industrial use of sodium carbonate.

(3 × 1) (3)

2.7 Name TWO industrial applications of sodium sulphate. (2)

2.8 What is the common name of sodium sulphate? (1)

2.9 Name FOUR steps involved in the mining of sodium chloride as a rock salt. (4)

[30]

QUESTION 3: SOAP, DETERGENTS AND PESTICIDES

3.1 Define the following terms:

3.1.1 Alkali

3.1.2 Hydrocarbons

(2 × 2) (4)

3.2 Name THREE products that are produced by the Colgate-Palmolive company. (3)

3.3 Write the chemical formula of the following substances that are used as raw materials in the production of soap:

3.3.1 Sodium hydroxide

3.3.2 Oleic acid

3.3.3 Lauric acid

(3 × 1) (3)

3.4 Herbicides are classified by the way they kill plants.

Name the THREE classes into which herbicides are classified. (3)

3.5 Classify the following insecticides as organic or inorganic:

3.5.1 Organophosphate

3.5.2 Carbamates

3.5.3 Boric acid

(3 × 1) (3)

3.6 Name THREE pesticide manufacturers in South Africa. (3)

[19]

QUESTION 4: PULP AND PAPER

4.1 Name FOUR pulp and paper manufacturers in South Africa. (4)

4.2 What is the main source of virgin fibre? (1)

4.3 Name the TWO groups of wood. (2)

4.4 The Kraft pulp production process has three main steps.

Name the THREE main steps. (3)

4.5 What is the purpose of supercalendering? (2)

4.6 Give THREE examples of coated paper. (3)

4.8 Name FIVE techniques that are used to laminate paper. (5)

[20]

TOTAL: 100

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