higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 3

(6050433)

13 November 2024 (X-paper)
09:00–12:00

This question paper consists of 6 pages and a periodic table.

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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. Start each section on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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QUESTION 1: FERTILISERS

1.1 Give ONE word or term for each of the following description. Write only the word or term next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 An inorganic compound made of nitrogen and oxygen that is added to soil to make it fertile.

1.1.2 Compounds that consist of carbon, oxygen, hydrogen and nitrogen, which are some of the most important building blocks of muscle.

1.1.3 The production of large amounts of the same products.

1.1.4 Any compound that contains potassium.

1.1.5 Man-made substances.

(5 × 1) (5)

1.2 Name TWO categories into which fertilisers are divided. (2)

1.3 Define the word *inorganic* in the context of *inorganic fertiliser*. (2)

1.4 Name the acid that is used as input in granular fertiliser. (1)

1.5 Name the first company to produce nitrogen fertiliser in the world. (1)

1.6 Which forms of fertiliser are the most commonly used in farming? (1)

1.7 Name FOUR advantages of liquid fertilisers over dry fertilisers. (4)

1.8 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–E) next to the question number (1.8.1–1.8.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.8.1	Phosphorus	A	building blocks of life
1.8.2	Potassium	B	liquid found in most plants
1.8.3	Sap	C	helps in photosynthesis
1.8.4	pH	D	measure of the acidity of soil on a scale from 0 to 14
1.8.5	DNA	E	its deficiency causes leaf scorch

(5 × 1) (5)

1.9 Name the instrument in which raw apatite is crushed and separated. (1)

1.10 Name the TWO most common forms of potash used in the fertiliser industry. (2)

1.11 Provide the molecular formula of iron sulphide. (1)

1.12 Which raw material is mostly used in industries for the production of sulphuric acid? (1)

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QUESTION 2: CEMENT, CALCIUM AND SODIUM COMPOUNDS

2.1 Name FIVE main manufacturers of cement in South Africa. (5)

2.2 Name FOUR calcareous rocks used as raw materials for cement. (4)

2.3 Name THREE of the most common iron oxides found in the mining of iron ore. (3)

2.4 Why is limestone added to iron ore during the mining and separation of raw materials? (2)

2.5 Write the chemical reaction that occurs inside, at the bottom of a furnace during the smelting process. (2)

2.6 Which company is the leading manufacturer of cement in South Africa? (1)

2.7 Why is a rotating (rotary) kiln used in the cement production process? (2)

2.8 Name THREE uses of calcium oxide. (3)

2.9 What is the industrial name of calcium oxide? (1)

2.10 Which sodium compound was used to preserve meat in ancient times? (1)

2.11 Give the molecular formula of the following compounds: (1)

2.11.1 Sodium bicarbonate

2.11.2 Caustic soda

2.11.3 Sodium sulphate

(3 × 1) (3)

2.12 Give the molecular formula of trona ore, the ore from which the world's sodium carbonate and bicarbonate are mined. (2)

2.13 Name the mineral from which most of the sodium sulphate is mined. (1)

2.14 Name the chemicals that are involved in the Solvay process. (3)

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QUESTION 3: SOAP, DETERGENTS AND PESTICIDES

3.1 Name FOUR leading detergents manufacturers in South Africa. (4)

3.2 Why are amphoteric compounds easily used in baby products? (2)

3.3 Why is sodium triphosphate used as a water softener? (3)

3.4 What are the most important raw materials in the production of soap? (3)

3.5 What is the main component of animal or vegetable fat used in soap production? (1)

3.6 Name THREE types of pesticides. (3)

3.7 What are the roles of the products of Dow Agro Sciences in the pesticides industry? (4)

3.8 Name TWO ways in which herbicides kill plants. (2)

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QUESTION 4: PULP AND PAPER

4.1 Name and explain TWO methods used to produce pulp. (2)

4.2 What is the difference between *mechanical* and *chemical* pulping? (4)

4.3 List the major pulp and paper companies in South Africa. (4)

4.4 What is the difference between *hardwood* and *softwood*? (4)

4.5 Many different types of coating machines can be used in the coating process. Name FOUR types of coating equipment that can be used. (4)

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TOTAL: 100

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PERIODIC TABLE

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