higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 2

(6050422)

2 December 2020 (X-paper)
09:00–12:00

This question paper consists of 6 pages.

223Q1N2002

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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. Start each question on a new page.
6. Write neatly and legibly.

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QUESTION 1

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 Herbicides control the spread of unwanted insects.

1.2 The National Water Act No. 36 of 1998 set up guidelines on matters affecting the environment.

1.3 Ion exchange is used to remove minerals from water.

1.4 Ozone is another form of oxygen that is found in the atmosphere.

1.5 Glass is part of the ceramic family.

(5 × 1) **[5]**

QUESTION 2

2.1 Name the South African companies that are responsible for the production of the following:

2.1.1 Research about nuclear products and new technologies

2.1.2 Production of glass

2.1.3 Production of petroleum products from coal

2.1.4 Production and mining of diamonds

(4 × 1) (4)

2.2 Coal is a fossil fuel that is formed through natural processes.

2.2.1 What are fossil fuels? (2)

2.2.2 List FOUR elements that are found in coal. (4)

2.2.3 Briefly discuss underground mining. (3)

2.3 Biochemicals can be found in nature or produced in large scale in industry.

2.3.1 Define the term *biochemicals.* (2)

2.3.2 Which company is responsible for the production of biochemicals in South Africa? (1)

2.3.3 List THREE examples of biochemical products. (3)

[19]

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QUESTION 3

3.1 Name TWO sources of water. (2)

3.2 State TWO ways in which water is used for domestic purposes. (2)

3.3 Municipalities and industries have different roles when it comes to wastewater treatment.

3.3.1 List THREE ways in which water is used in industry. (3)

3.3.2 Name TWO contaminants found in industrial wastewater. (2)

3.3.3 Briefly discuss the role of municipalities in wastewater treatment. (3)

3.4 What does the abbreviation NEMA stand for? (1)

3.5 Write brief descriptions to explain the purpose of the following processes:

3.5.1 Primary sedimentation

3.5.2 Activated sludge treatment

3.5.3 Solid treatment

(3 × 2) (6)
[19]

QUESTION 4

4.1 Water purification plants receive water from a water source like a river or a dam and it is then dosed with chemicals to remove turbidity.

4.1.1 What is turbidity? (1)

4.1.2 Name TWO types of flocculants. (2)

4.2 Draw a labelled process flow diagram of a distillation process. (7)
[10]

QUESTION 5

5.1 State TWO industrial applications of each of the following:

5.1.1 Ozone

5.1.2 Hydrogen

5.1.3 Chlorine

5.1.4 Carbon dioxide

(4 × 2) (8)

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5.2 Air is a mixture of different gases.

5.2.1 List THREE components of air. (3)

5.2.2 Draw a labelled process flow diagram of fractional distillation of air. (8)
[19]

QUESTION 6

6.1 Glass is highly valued because it is 100% recyclable and safe for packaging foodstuffs.

6.1.1 List THREE properties of glass. (3)

6.1.2 Briefly explain why glass is good for packaging foodstuffs. (2)

6.2 Lead glass is called that because of its high percentage of lead content.

6.2.1 What are the main components of lead glass? (2)

6.2.2 Explain why it is fine to use lead glasses for wine, while it is not advisable to store food in lead glass containers. (3)

6.2.3 Name TWO properties of lead glass. (2)

6.2.4 List THREE common uses of lead glass. (3)

6.3 Write down the chemical formulas of the following compounds:

6.3.1 Silicon dioxide

6.3.2 Calcium carbonate

6.3.3 Sodium sulphate

6.3.4 Selenium oxide

(4 × 1) (4)
[19]

QUESTION 7

7.1 In which cases would you use the following fire extinguishers?

7.1.1 Water

7.1.2 CO_2

7.1.3 Foam

7.1.4 Dry chemical powder

(4 × 1) (4)

7.2 Write short notes about evacuation. (3)

7.3 Give TWO examples of personal protective equipment (PPE). (2)
[9]

TOTAL: 100

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