higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 2

(6050422)

16 November 2023 (Y-paper)
13:00–16:00

This question paper consists of 6 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
PROCESS CHEMISTRY
NQF LEVEL 2
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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SECTION A

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 Sasol uses coal to produce petrol and other by-products such as diesel fuel and waxes.

1.2 Lubricants are substances that allow parts to rub together without causing friction.

1.3 Minerals are substances that are used to prevent pests and they are harmful.

1.4 Intermediate chemicals are part of a group of chemicals produced by reacting base chemicals with each other to make new chemicals.

1.5 The term *natural gas* usually refers to the mixture of gases that formed from fossil fuels.

(5 × 1) **[5]**

QUESTION 2

Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–N) next to the question number (2.1–2.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1	The removal of salt from seawater and making it drinkable	A	chromium
2.2	Maximum amount of specific contaminants that is allowed in water before it becomes unsafe	B	diffuser
2.3	Toxic chemical substance found in paints and anti-corrosion products	C	iron
2.4	Removal of large objects from waste water using perforated mesh or similar items	D	scaling
2.5	A device that spreads air over an area, reducing the size of the bubbles	E	ultra clean water
2.6	Grease and oil that accumulate at the sides of tanks	F	protons
2.7	Chemical that tends to change water to a rusty orange colour	G	desalination
2.8	Solid crust formed by minerals from water when it is heated	H	contamination limit
2.9	Negatively charged sub-atomic particles surrounding the nucleus of an atom	I	electrons
2.10	Water containing very few or no contaminants	J	scum
		K	screening
		L	neutrons
		M	chlorine
		N	distilled water

(10 × 1) **[10]**

QUESTION 3

Give ONE term for each of the following descriptions by writing it next to the question number (3.1–3.5) in the ANSWER BOOK.

3.1 Process of passing an electrical current through a chemical solution to form new products

3.2 A colourless, odourless gas that is slightly lighter than air and carries a volume of 78% of the atmosphere

3.3 A process used to produce ammonia industrially

3.4 A process used to separate metals from impurities by heating the ore until it reaches melting point

3.5 A molecule consisting of two atoms bonded chemically

(5 × 1) **[5]**

TOTAL SECTION A: 20

SECTION B

QUESTION 4

4.1 Crude oils and natural gases are raw materials that consist of hydrocarbons, derived from fossilised marine organisms.

4.1.1 List THREE valuable products derived from crude oil. (3)

4.1.2 Define the term *hydrocarbon.* (2)

4.2 Briefly describe how coal is recovered through underground mining. (4)

4.3 Name FOUR companies responsible for producing minerals. (4)

4.4 Explain the difference between *base metals* and *precious metals*. (2)

[15]

QUESTION 5

5.1 Name FIVE steps in sequence of typical wastewater treatment. (5)

5.2 Briefly discuss the following:

5.2.1 Flash mixing in water purification (3)

5.2.2 Filtration in water treatment (3)

5.3 Define the term *sustainable development*. (2)

5.4 Draw a full labelled diagram of the distillation process. (7)

5.5 Name any FIVE uses of hydrogen. (5)
[25]

QUESTION 6

6.1 Describe FOUR economic disadvantages of gas production in South Africa. (4)

6.2 Name FOUR noble gases. (4)

6.3 Define the term *liquefaction*. (2)

6.4 List THREE types of glass refining agents. (3)

6.5 Briefly discuss conditioning during the glass melting process. (5)

6.6 Draw a fully labelled flow diagram of the glass making process. (12)
[30]

QUESTION 7

7.1 Name FOUR types of safety equipment that should be used whenever hazardous chemicals are being transferred. (4)

7.2 Briefly discuss the term *volatility*. (4)

7.3 Indicate what the following personal protective equipment is used for:

7.3.1 Overalls

7.3.2 Face shield

(2 × 1) (2)
[10]

TOTAL SECTION B: 80
GRAND TOTAL: 100

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