higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 2

(6050422)

7 November 2022 (Y-paper)
13:00–16:00

This question paper consists of 7 pages and a periodic table.

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

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SECTION A

QUESTION 1

Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 … is made up mostly of carbon, but it also contains hydrogen, oxygen, and sulphur.

A Oil
B Coal
C Lubricant
D Natural gas

1.2 The property of an object that compares mass and volume:

A pH
B Pressure
C Temperature
D Density

1.3 An example of a toxic substance is …

A hydrocarbon.
B insecticides.
C $CaCl_2$.
D chlorides.

1.4 A solution that conducts electricity:

A Electrolyte
B Flotation
C Electricity
D Radiation

1.5 … is the study of life and living things such as bacteria, animals and plants.

A Biology
B Nuclear science
C Matter
D Penicillin

(5 × 1) **[5]**

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QUESTION 2

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1–2.5) in the ANSWER BOOK.

2.1 Intermediate chemicals are also called secondary products.

2.2 Combustion refers to the reaction of a fuel with oxygen.

2.3 Speciality chemicals are produced in low volumes but are of even higher value than normal end products.

2.4 Gases are usually visible and have no weight or mass.

2.5 The term *natural gas* usually refers to the mixture of liquid that forms crude oil.

(5 × 1) **[5]**

QUESTION 3

Complete the following paragraph by writing only the missing word or words next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

(3.1.1) … that surrounds the earth is the main source of oxygen for living things; it is made up of about 78% (3.1.2) … and 21% (3.1.3) …, with small amounts of other elements such as argon, krypton, and xenon. Depending on the location, other industrial pollutants such as (3.1.4) … may also be present in the air. Air is recovered by using a large (3.1.5) … pump, which uses differences in pressure to force the gas to move in the direction of the lower pressure.

(5 × 1) **[5]**

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QUESTION 4

Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–G) next to the question number (4.1–4.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
4.1	A process used to separate metals from waste ore	A	flotation
4.2	Glass cookware	B	bromine
4.3	Separation process based on density	C	detergents
4.4	Have good cleaning properties	D	smelting
4.5	Consumer product that is used every day	E	Pyrex
		F	petrol
		G	helium

(5 × 1) **[5]**

TOTAL SECTION A: 20

SECTION B

QUESTION 5

5.1 Write brief notes about water hardness. (4)

5.2 Briefly discuss the following:

5.2.1 The polluters must pay principle

5.2.2 Flash mixing in the water purification process

(2 × 3) (6)

5.3 Explain the term *incineration*. (2)

5.4 Draw a labelled process flow diagram of water purification. (8)

[20]

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QUESTION 6

6.1 Write the chemical formulas of the following industrial gases:

6.1.1 Carbon dioxide

6.1.2 Xenon

6.1.3 Argon

6.1.4 Ozone

6.1.5 Helium

(5 × 1) (5)

6.2 Name FIVE uses of hydrogen. (5)

6.3 Draw a diagram illustrating the conversion of natural gas to acetylene. (10)
[20]

QUESTION 7

7.1 Name THREE manufacturers of glass in South Africa. (3)

7.2 List SIX uses of commercial glass. (6)

7.3 Glass production is a very complicated and precise process.

Describe and also give an example of the following agents used during glass refining processes:

7.3.1 Glass release agents

7.3.2 Physical property changing agents

7.3.3 Solution agents

(3 × 3) (9)

7.4 Define the term *cullet*. (2)
[20]

QUESTION 8

8.1	Write short explanatory notes on emergency showers.	(4)
8.2	What is *solid waste*?	(4)
8.3	Give a brief description of *fire doors*.	(6)
8.4	Name THREE types of safety equipment.	(3)
8.5	Name THREE types of fire extinguishers.	(3)
		[20]

TOTAL SECTION B: 80
GRAND TOTAL: 100

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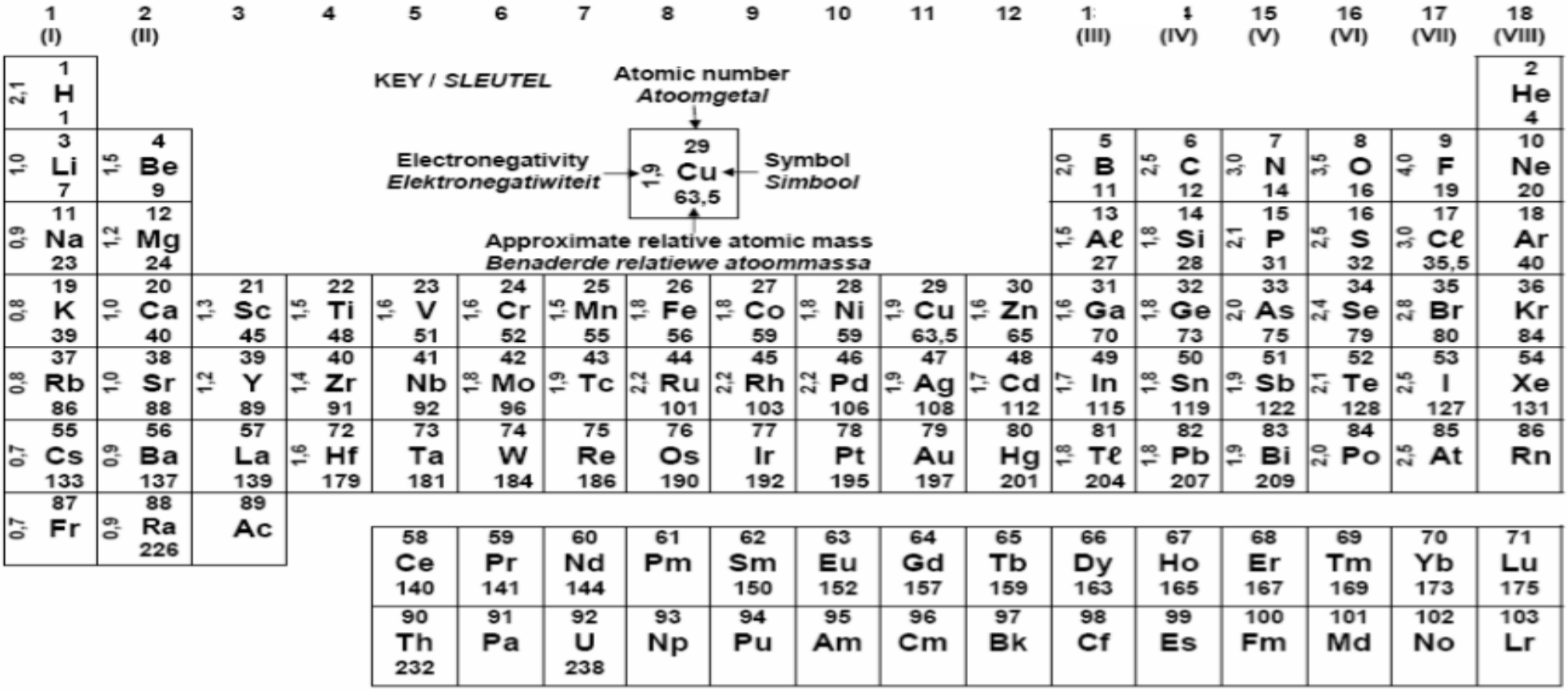
THE PERIODIC TABLE OF ELEMENTS
DIE PERIODIEKE TABEL VAN ELEMENTE



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