higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1770**(E)**(A1)T

NATIONAL CERTIFICATE

WATER TREATMENT PRACTICE N3

(8120033)

1 August 2019 (X-Paper)
09:00–12:00

Nonprogrammable calculators may be used.

This question paper consists of 5 pages and 1 periodic table.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
WATER TREATMENT PRACTICE N3
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. Write neatly and legibly.

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QUESTION 1

Give ONE term for each of the following descriptions. Write only the term next to the question number (1.1–1.10) in the ANSWER BOOK.

1.1 Process of separating settleable solids and water due to gravity

1.2 Water treatment process that kills disease-causing organisms

1.3 Point at which a chlorine dosage has satisfied a chlorine demand

1.4 Water treatment process that causes very small suspended particles to attract one another and form smaller particles

1.5 Mechanical device usually used in connection with a pressure-containing vessel to completely stop or regulate flow

1.6 Process of removing organics and colour in the main plant

1.7 Collection of smaller particles that come together in larger, more settleable particles as a result of coagulation

1.8 Colour remaining once the turbidity has been removed

1.9 Electrochemical reaction in nature

1.10 Organism consisting of unicellular plants which usually contain chlorophyll

(10 × 1) **[10]**

QUESTION 2

2.1 Complete the following table by writing only the correct conversion next to the question number (2.1.1–2.1.7) in the ANSWER BOOK.

Litres	Cubic meters	Megalitres
200	(2.1.1)	(2.1.2)
(2.1.3)	1,9	0,0019
(2.1.4)	500	(2.1.5)
888 000	(2.1.6)	(2.1.7)

(7 × 1) (7)

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2.2 Complete and balance each of the following reactions:

2.2.1 $FeCl_3 + Ca(HCO_3)_2 \longrightarrow$ (5)

2.2.2 $NH_3 + HOCl \longrightarrow$ (2)

2.2.3 $MgCO_3 + Ca(OH)_2 \longrightarrow$ (2)

2.3 Calculate the molecular masses of each of the following compounds:

2.3.1 Hypochlorous acid (3)

2.3.2 Carbon monoxide (2)

[21]

QUESTION 3

3.1 Copy the table below to the ANSWER BOOK and indicate the properties of each chemical with an X. A chemical can have one or more properties.

Chemical	Coagulant or aid	Alkalinity and pH control	Disinfection	Taste and odour	Mineral oxidation	Softening
Aluminium sulphate						
Calcium carbonate						
Calcium oxide						
Chlorine						
Ozone						
Sodium carbonate						
Sodium hydroxide						

(15 × 1) (15)

3.2 Determine the capacity of a reservoir with a diameter of 60 meter and height of 12 meter in litres. (4)

[19]

QUESTION 4

4.1 List the FOUR main groups into which surface water could be classified. (4)

4.2 Briefly explain the disadvantages of pressure sand filters. (5)

4.3 Manganese removal is more complicated and difficult than iron removal.

Name FIVE methods used for the removal of iron and manganese. (5)

4.4 List SIX factors that influence the efficient coagulation and flocculation on a laboratory jar test. (6)

[20]

QUESTION 5

5.1 Name THREE impurities found in water. (3)

5.2 Backwashing is a critically important step in the filtration process.

5.2.1 What is backwashing? (2)

5.2.2 Name THREE problems caused by poor backwashing. (3)

5.3 List SEVEN factors affecting the sedimentation process. (7)

5.4 Describe the FIVE properties of chlorine gas. (5)

[20]

QUESTION 6

6.1 Name and explain the substances active in causing corrosion in the treatment of electrolytes. (3 × 2) (6)

6.2 Give TWO common coagulants used in water treatment. (2)

6.3 Name TWO problems that commonly occur with hypochlorinators. (2)

[10]

TOTAL: 100

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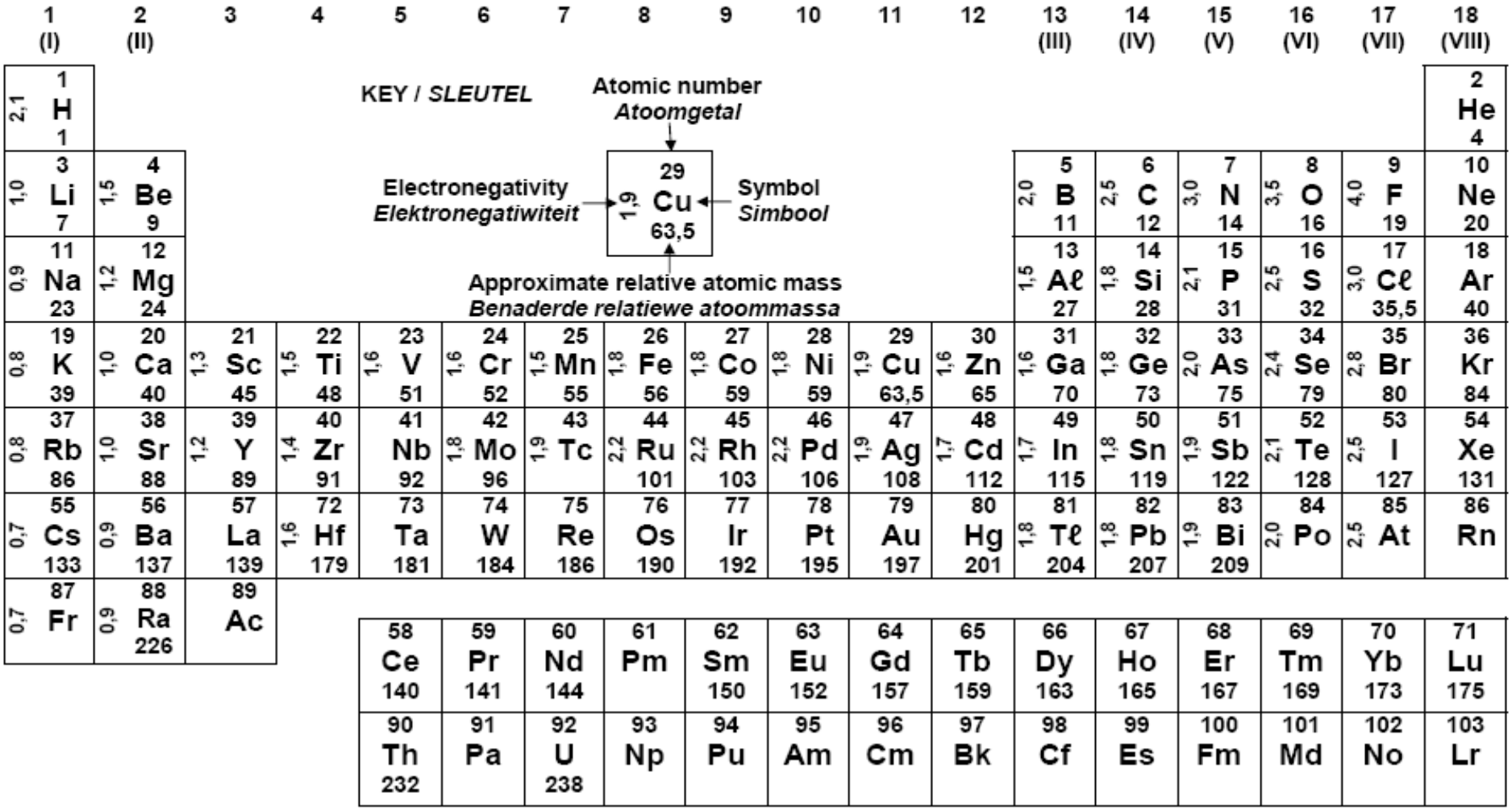
(8120033)

THE PERIODIC TABLE OF ELEMENTS
DIE PERIODIEKE TABEL VAN ELEMENTE



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