higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

WATER TREATMENT PRACTICE N3

(8120033)

30 July 2021 (X-paper)
09:00–12:00

This question paper consists of 4 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. Start each question on a new page.
5. Only use a black or blue pen.
6. Write neatly and legibly.

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QUESTION 1

1.1 Give the chemical name for each of the following chemical formulae:

1.1.1 $CaCO_3$

1.1.2 H_2SO_3

1.1.3 $Mg(HCO_3)_2$

1.1.4 $Ca(OH)_2$

1.1.5 CO

(5 × 1) (5)

1.2 Calculate the molecular mass of the following compounds:

1.2.1 Sodium Hydroxide (3)

1.2.2 Ferric Oxide (Rust) (4)

1.2.3 Soda ash (3)

[15]

QUESTION 2

2.1 Suspended matter is one of the general impurities found in water.

Name FOUR such type and state their effects on water. (8)

2.2 Name THREE sources coming from surface run-off. (3)

2.3 Briefly explain the impact of the following dissolved salts found in water.

2.3.1 Calcium and Magnesium (5)

2.3.2 Iron and Manganese (5)

[21]

QUESTION 3

3.1 Name FOUR types of water related diseases caused by pathogens in water. (4)

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3.2 Water quality needs to be assessed and monitored to ensure water quality and check risk indicators.

COPY and COMPLETE the following table to minimum monitoring frequency.

DETERMINANT	RAW WATER	FINAL WATER	DISTRIBUTION SYSTEM
pH Value	———	Once / 8 hour shift Daily	———
Turbidity	———	———	Fortnight
Conductivity or TDS	Daily	———	———

(6)

3.3 Water safety is indicated by using different colours to explain when water is safe or ready for use according to the colour classification system.

Use the blue, green, yellow, red and purple colour to classify water safety. (4)

3.4 Briefly describe the *stability index test* (Ryznar). (5)

[19]

QUESTION 4

4.1 Use a simple sketch to illustrate the flow diagram of a water treatment purification plant. (10)

4.2 List FIVE components of a pressure relief valve in the open position. (5)

4.3 What is the purpose of sedimentation in a water plant? (3)

4.4 Briefly explain floc formation in water. (5)

4.5 Give the theoretical formula to calculate retention time. (2)

[25]

QUESTION 5

5.1 Explain the different methods of *pre-chlorination* and *post chlorination*. (6)

5.2 Use the chemical reaction to explain the breakpoint chlorination when chlorine is added to water containing ammonia. (4)

5.3 List SIX chemicals used to destruct harmful bacteria in water treatment. (6)

5.4 Name FOUR different colours use for safety identification in industries. (4)

[20]

TOTAL: 100

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TABLE 3: THE PERIODIC TABLE OF ELEMENTS
TABEL 3: DIE PERIODIEKE TABEL VAN ELEMENTE

1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
2,1 **H** 1																	**He** 4
1,0 **Li** 7	1,5 **Be** 9											2,0 **B** 11	2,5 **C** 12	3,0 **N** 14	3,5 **O** 16	4,0 **F** 19	**Ne** 20
0,9 **Na** 23	1,2 **Mg** 24											1,5 **Aℓ** 27	1,8 **Si** 28	2,1 **P** 31	2,5 **S** 32	3,0 **Cℓ** 35,5	**Ar** 40
0,8 **K** 39	1,0 **Ca** 40	1,3 **Sc** 45	1,5 **Ti** 48	1,6 **V** 51	1,6 **Cr** 52	1,5 **Mn** 55	1,8 **Fe** 56	1,8 **Co** 59	1,8 **Ni** 59	1,9 **Cu** 63,5	1,6 **Zn** 65	1,6 **Ga** 70	1,8 **Ge** 73	2,0 **As** 75	2,4 **Se** 79	2,8 **Br** 80	**Kr** 84
0,8 **Rb** 86	1,0 **Sr** 88	1,2 **Y** 89	1,4 **Zr** 91	**Nb** 92	1,8 **Mo** 96	1,9 **Tc**	2,2 **Ru** 101	2,2 **Rh** 103	2,2 **Pd** 106	1,9 **Ag** 108	1,7 **Cd** 112	1,7 **In** 115	1,8 **Sn** 119	1,9 **Sb** 122	2,1 **Te** 128	2,5 **I** 127	**Xe** 131
0,7 **Cs** 133	0,9 **Ba** 137	**La** 139	1,6 **Hf** 179	**Ta** 181	**W** 184	**Re** 186	**Os** 190	**Ir** 192	**Pt** 195	**Au** 197	**Hg** 201	1,8 **Tℓ** 204	1,8 **Pb** 207	1,9 **Bi** 209	2,0 **Po**	2,5 **At**	**Rn**
0,7 **Fr**	0,9 **Ra** 226	**Ac**															

Ce 140	**Pr** 141	**Nd** 144	**Pm**	**Sm** 150	**Eu** 152	**Gd** 157	**Tb** 159	**Dy** 163	**Ho** 165	**Er** 167	**Tm** 169	**Yb** 173	**Lu** 175
Th 232	**Pa**	**U** 238	**Np**	**Pu**	**Am**	**Cm**	**Bk**	**Cf**	**Es**	**Fm**	**Md**	**No**	**Lr**

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