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Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

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WATER TREATMENT PRACTICE N3

(8120033)

6 April 2020 (X-paper)
09:00–12:00

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

118Q1A2006



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.
-

QUESTION 1

Choose a term from COLUMN B that matches a term in COLUMN A. Write only the letter (A–J) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.1.1	Ammonia	A	microscopic plants
1.1.2	Pathogens	B	calcium hydroxide
1.1.3	Algae	C	flocculation 
1.1.4	Micro organisms	D	calcium bicarbonate
1.1.5	Lime	E	sodium carbonate
1.1.6	Turbidity	F	breakpoint chlorination
1.1.7	Upward flow	G	measured in ntu
1.1.8	Soda ash	H	harmful bacteria
1.1.9	Coagulation 	I	contact bed
1.1.10	Carbonate hardness	J	protozoa

(10 × 1) (10)

1.2 Indicate whether the following substances in drinking water cause PHYSICAL, CHEMICAL or TOXIC problems by writing only 'Physical', 'Chemical' or 'Toxic' next to the question number (1.2.1–1.2.5) in the ANSWER BOOK.

1.2.1 Chloride

1.2.2 Calcium carbonate

1.2.3 Arsenic

1.2.4 Lead 

1.2.5 Turbidity

(5 × 1) (5)
[15]

QUESTION 2

2.1 State THREE main properties of water regarding hydraulics. (3)

2.2 Define each of the following:

2.2.1 Syphon


2.2.2 Filtration

2.2.3 Turbidity 

2.2.4 Disinfection

2.2.5 Backwashing

(5 × 2) (10)


2.3 Give SEVEN advantages of a centrifugal pump.  (7)
[20]

QUESTION 3

3.1 Write brief notes on the presence of each of the following in water:

3.1.1 Algae

3.1.2 Iron and manganese

 (8 × 2) (16)



3.2 Name THREE stages of the natural water cycle. (3)

3.3 State THREE reasons why quality water requires treatment. (3)


3.4 Name THREE impurities found in water. (3)

[25]

QUESTION 4

- 4.1 Write a balanced chemical reaction for each of the following:
- 4.1.1 Iron reacting with oxygen  (4)
- 4.1.2 Unslaked lime treated with water to form slaked lime (3)
- 4.1.3 Lime reacting with calcium bicarbonate to form limestone (5)
- 4.2 Determine the capacity of a reservoir with a diameter of 60 meters and a height of 10 meters. (4)
- 4.3 How long will it take to fill the reservoir in QUESTION 4.2 if a pump with a capacity of 12 l/s is used?  (4)
- [20]**

QUESTION 5

- 5.1 State FOUR properties of chlorine. (4)
- 5.2 Use a labelled sketch to describe a rapid gravity sand filter. (10)
- 5.3 Water stability with a pH of 8,7 has the following properties:
- TDS 400 mg/l = 0,16 
- Temperature 300 °C = 1,88
- Ca hardness 70 mg/l = 1,45
- Alkalinity as CaCO₃ 40 mg/l = 1,60
- Determine the saturation index. (6)
- [20]**

TOTAL: 100

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

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18						
		(I)	(II)	KEY/SLEUTEL											(III)	(IV)	(V)	(VI)	(VII)	(VIII)					
		Atomic number Atoomgetal		Electronegativity Elektronegatiwiteit											Approximate relative atomic mass Benaderde relatiewe atoommassa										
		Symbol Simbool		Symbol Simbool											Symbol Simbool										
1	1	H	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18					
2	2	Li	3	Be	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19					
3	3	Na	11	Mg	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27					
4	4	K	19	Ca	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35					
5	5	Rb	37	Sr	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53					
6	6	Cs	55	Ba	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71					
7	7	Fr	87	Ra	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103					
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