higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1740**(E)**(A3)T

NATIONAL CERTIFICATE

WASTE-WATER TREATMENT PRACTICE N3

(8120003)

3 August 2018 (X-Paper)
09:00–12:00

This question paper consists of 4 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
WASTE-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. Write neatly and legibly.

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QUESTION 1

The following statements are FALSE. Correct the statement by writing ONLY the correct term or word next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 Kinetic energy is the amount of energy applied to move an object over a certain distance.

1.2 Hydraulic radius is the line connecting the level of elevation plus pressure energies.

1.3 Soft water contains a lot of salts and can cause diarrhoea.

1.4 The pressure of a gas is an indication of the average kinetic energy of its molecules.

1.5 Macrophytes use carbon dioxide or bicarbonates as a carbon source.

(5 × 2) **[10]**

QUESTION 2

2.1 Convert the following to the units as indicated below:

2.1.1 1000 000 cm^3 = …….. m^3

2.1.2 1000 000 mg = ……. kg

2.1.3 2 megalitre = ……... cm^3

(3 × 2) (6)

2.2 Calculate the density of $FeCl_2$ if the mass of the empty volumetric flask is 550 g and when the flask is filled with 1 000 ml $FeCl_2$ at 20 °C has a mass of 2 000 g. (4)

2.3 Draw a labelled sketch to illustrate the principle of hydrostatic pressure making use of a network, inclusive of components such as; a pipeline, reservoir, standpipe (piezometer) and a valve. (6)

2.4 The failure of a reciprocating pump to deliver water may be due to some reasons.

State FOUR such reasons. (4)

[20]

QUESTION 3

3.1 Name FOUR basic types of valves. (4)

3.2 Write the chemical symbols of each of the following elements:

3.2.1 Copper

3.2.2 Silicon

3.2.3 Aluminium

(3 × 2) (6)

3.3 Name THREE methods of identifying bacteria in a sample. (3)

3.4 Define *marine discharge*. (2)

3.5 State FIVE factors that must be considered when sewage is to be disposed of in sea water. (5)

[20]

QUESTION 4

4.1 Name THREE causes of problems in sewers. (3)

4.2 Why is it recommended that domestic sewage and industrial waste water be treated together? (6)

4.3 Describe THREE reasons for removing grit and silt from the sewage in the pretreatment. (6)

4.4 Define *belching*. (2)

4.5 Name FIVE causes of belching. (5)

4.6 In the biological filters, domestic waste water sprinkled over a fixed media produces biological growth called zooglea.

List THREE types of these zooglea feeding on waste organics. (3)

[25]

QUESTION 5

5.1 Draw a flow diagram of a typical biological filtration sewage purification plant from pretreatment (inlet works) until tertiary treatment. (15)

5.2 List FOUR advantages of dewatering using filter presses. (4)

5.3 Name SIX causes of fire in treatment plants. (6)

[25]

TOTAL: 100

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