higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

WATER AND WASTE-WATER TREATMENT PRACTICE N2

(8120022)

14 April 2021 (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
WATER AND WASTE-WATER TREATMENT PRACTICE N2
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. Sketches must be large, neat and fully labelled.
5. Start each question on a new page.
6. Use only a black or blue pen.
7. Write neatly and legibly.

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QUESTION 1

Complete the following sentences by writing only the missing word or words next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 Toxic substances have a/an … effect on humans, animals or plants.

1.2 Flow measurement is the quantification of … movement.

1.3 Acetogen is a microorganism that generates acetate as a product of ... respiration.

1.4 … flocculants are not normally added to water treated by a slow sand filter because the fine sand would clog too quickly.

1.5 The greatest strength of ... samples is the ability to take into account changes in flow and other characteristics of the water over time.

(5 × 1) **[5]**

QUESTION 2

2.1 Explain each of the following terms:

2.1.1 pH

2.1.2 Turbidity

2.1.3 Activated sludge process

2.1.4 Laterite

2.1.5 Grab sample

(5 × 2) (10)

2.2 Briefly explain each of the following:

2.2.1 Measuring devices

2.2.2 Handraked screens

(2 × 5) (10)
[20]

QUESTION 3

3.1 Briefly discuss each of the following stages of water treatment:

3.1.1 Coagulation (2)

3.1.2 Clarification (2)

3.1.3 Filtration (4)

3.1.4 Disinfection (2)

3.2 Draw a labelled diagram of a venturi tube. (5)

3.3 Explain the operating principle of magnetic flowmeters. (5)
[20]

QUESTION 4

4.1 What are the requirements of each process unit in a water-treatment plant? (10)

4.2 Briefly explain how aluminium sulphate is used as flocculating agent in a water-treatment plant. (6)

4.3 Name the FOUR key biological and chemical stages that take place during anaerobic fermentation. (4)
[20]

QUESTION 5

5.1 Draw a fully labelled flow diagram that shows the combined treatment of waste water during the primary, secondary and tertiary stages. (15)

5.2 Name FIVE factors that influence the sedimentation process. (5)
[20]

QUESTION 6

6.1 Briefly explain each of the following types of sedimentation tanks:

6.1.1 Horizontal-flow sedimentation tanks

6.1.2 Vertical-flow sedimentation tanks

6.1.3 Radial-flow sedimentation tanks (3 × 4) (12)

6.2 Define the term *sampling* as it applies to a water and waste-water treatment plant. (3)
[15]

TOTAL: 100

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