higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

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NATIONAL CERTIFICATE

WATER AND WASTE-WATER TREATMENT PRACTICE N2

(8120022)

5 August 2019 (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. Write neatly and legibly.

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QUESTION 1

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 One Hazen unit represents the colour occurring when 1 mg of platinum is dissolved in water.

1.2 Nitrate is a toxic substance which may lead to a sickness called methaemoglobinaemia, which causes the death of children under the age of two years.

1.3 After preliminary treatment, the next step is softening and stabilisation.

1.4 The sedimentation tanks used in the secondary treatment, often referred to as secondary clarifiers, operate in the same way as the primary clarifiers.

1.5 Mechanical aerators spray liquid droplets through the air and consist of motor, gearbox and aerating devices.

(5 × 1) **[5]**

QUESTION 2

2.1 Write short notes to differentiate between *total viable organisms*, *total coliform organisms* and *faecal coliforms*. (10)

2.2 Why is it necessary to measure flow in a water/waste-water treatment plant? (6)

2.3 Name the factors which influence the stability of water. (4)

[20]

QUESTION 3

3.1 Water with a pH of 7,6 has the following properties:

Tds:	400 mg/l	Factor A = 0,18
Temperature:	31 degrees	Factor B = 1,86
Calcium hardness:	70 mg/l	Factor C = 1,56
Alkalinity:	55 mg/l	Factor D = 1,56

Calculate the stability pH by using factor values. (5)

3.2 Name FOUR devices which are commonly used to achieve 'flash mixing'. (4)

3.3 Write brief notes on the storing of ferric chloride. (5)

3.4 Draw a fully labelled diagram of a magnetic flow meter. (6)

[20]

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QUESTION 4

4.1 Give the THREE steps in the flocculation process in the correct order. (3)

4.2 Name FOUR flocculants which are generally used in the clarification of water. (4)

4.3 Name the FOUR parts of a horizontal-flow sedimentation tank. (4)

4.4 Name SIX factors which may have an effect on sedimentation. (6)

4.5 How would you detect chlorine leaks? (3)
[20]

QUESTION 5

5.1 Describe the biological filtration process. (10)

5.2 Discuss the process of phosphate removal. (5)

5.3 Draw a fully labelled diagram of a rapid sand filter. (10)
[25]

QUESTION 6

6.1 List the FOUR main sampling methods. (4)

6.2 Name TWO preservatives for samples. (2)

6.3 What is meant by a 'grab sample'? (2)

6.4 6.4.1 Name the test used to determine the stability of effluent

6.4.2 Name the indicator solution used in the test mentioned in QUESTION 6.4.1.

(2 × 1) (2)
[10]

TOTAL: 100

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