higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

WATER AND WASTE-WATER TREATMENT PRACTICE N2

(8120022)

23 November 2022 (X-paper)
09:00–12:00

Drawing instruments may be used.

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

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QUESTION 1

Give ONE term for each of the following descriptions by writing it next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 Gives an indication of the bacterial pollution in the water and the amount of organic material available as nutrients to the bacteria.

1.2 Any physical, chemical or mechanical process used on water before it undergoes the main treatment process.

1.3 The main objective of this process is to further treat the effluent from the primary treatment to remove residual organics and suspended solids.

1.4 Process for treating sewage and industrial waste water using air and a biological floc composed of bacteria and protozoa.

1.5 Process used to select a small portion of water or waste water for the purpose of determining the characteristics of an entire batch of water or waste water.

(5 × 2) **[10]**

QUESTION 2

2.1 Write the answers for 2.1.1 to 2.1.8 in your ANSWER BOOK:

Parameter	General standard	Special standard
Suspended solids	2.1.1	2.1.2
Faecal coliforms	2.1.3	2.1.4
Mercury	2.1.5	2.1.6
Arsenic	2.1.7	2.1.8

(8 × 1) (8)

2.2 Calculate the volume of water in a cylinder with the following dimensions:

Height = 25 metres
Diameter = 14 metres (6)

2.3 Name THREE main chemical dosing methods used at water-treatment works. (3)

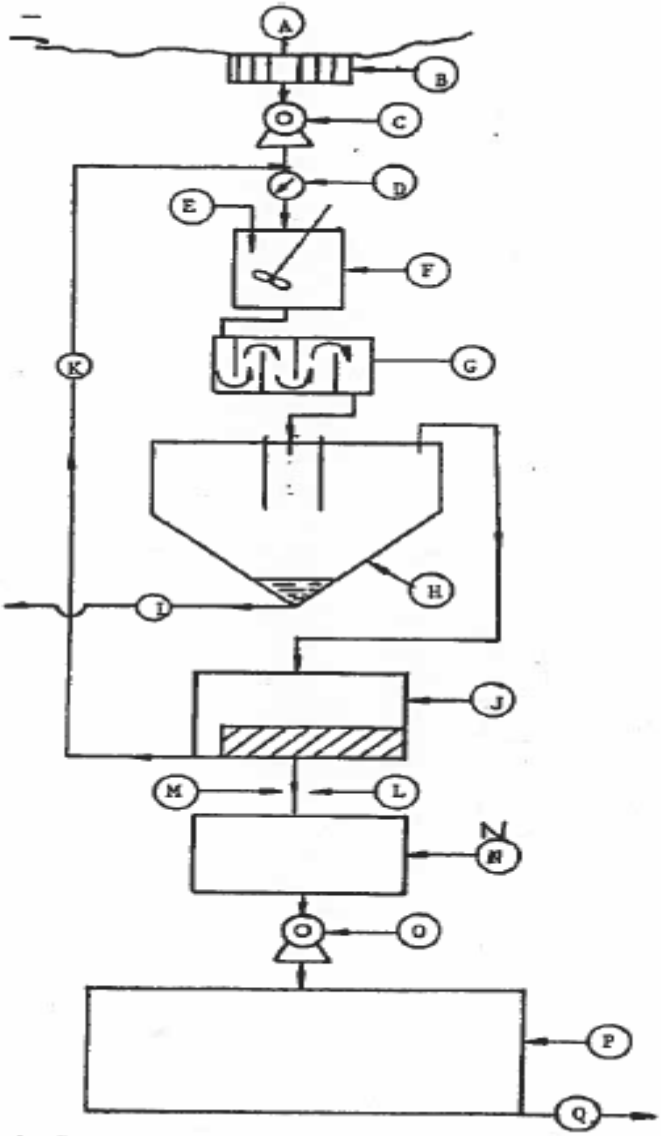
2.4 Name THREE devices commonly used to achieve flash mixing. (3)

[20]

QUESTION 3

3.1 Explain what is sodium hypochlorite and describe its characteristics . (5)

3.2 Label the diagram by writing only the answer next to the letter (A–Q) in the ANSWER BOOK.



(15 × 1) (15)
[20]

QUESTION 4

4.1 Briefly explain each of the following stages of water treatment:

4.1.1 Coagulation (2)

4.1.2 Clarification (2)

4.1.3 Filtration (4)

4.1.4 Disinfection (2)

4.2 Draw a labelled diagram of a rapid sand filter. (10)
[20]

QUESTION 5

5.1 Name and explain the THREE separate components in a clarifier tank. (3 × 2) (6)

5.2 Name the THREE components that sludge consists of. (3)

5.3 What is *anaerobic fermentation*? (3)

5.4 Different methods of sampling wastewater is important to know what is happening in the sewage plant. Name and explain TWO methods of sampling (3 × 2) (6)

5.5 Name TWO methods used to introduce air into aeration with compressed air. (2)
[20]

QUESTION 6

Draw a fully labelled flow diagram showing all stages during the dewatering and drying cycle. **[10]**

TOTAL: 100