higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

WASTE-WATER TREATMENT PRACTICE N3

8 AUGUST 2019

This marking guideline consists of 5 pages.

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QUESTION 1

1.1
1.1.1 Ampere
1.1.2 Joule
1.1.3 Kilogram
1.1.4 Cubic meter
1.1.5 Watt

(5 × 2) (10)

1.2
- Head loss
- Hydraulic gradient
- Scale and roughness inside the pipe
- Bends
- Hydraulic radius of the water in the pipes
- Valves
- Obstructions

(Any 5 × 1) (5)

1.3 Advantages
- Tight shut-off
- Low headloss
- Small space required
- Throttling capabilities

Disadvantage
- Disk always in flow stream, causing head loss. (5)

1.4
- Untreated industrial wastewater
- Fertiliser
- Chemicals
- Herbicides
- Pesticides
- Sewage
- Bacteria

(Any 5 × 1) (5)
[25]

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QUESTION 2

2.1 2.1.1 The breakdown of ammonia✓and other nitrogen-containing✓ compounds into nitrite and nitrates✓ (3)

2.1.2 It is the reduction of nitrates by organisms✓and in the process nitrogen gas✓ is released which bubbles to the surface and is released into the atmosphere✓ (3)

2.1.3 Bacteria which grow with or without oxygen (2)

2.2
- Coarse suspended solids – detritus channel
- Fine suspended solids – primary sedimentation
- Colloidal solids – biofilter (3 × 2) (6)

2.3
- Odourless
- Does not attract pests like flies
- Does not have disease-causing organisms
- Readily dewaterable
- Can be disposed of without nuisance (Any 4 × 1) (4)

2.4
- Radial flow
- Vertical flow
- Horizontal flow
- Circular radial flow (4)

2.5
- Land conditioning
- Landfill
- Sea (3)

2.6
- Unstable organic matter
- Most disease-causing organisms (Any ONE) (1)

[26]

QUESTION 3

3.1 Causes
- Sudden increase in temperature of the incoming sewage
- Excessive flow
- Insufficient desludging

Corrective measures
- Find short-circuit case
- Check for restrictions (5)

3.2 It indicates the ease with which sludge settles. The lower the SVI the better. It is the density of the settled sludge in mg/l. (2)

3.3
- Do not smoke at work.
- Wash hands after working with sludge.
- Do not touch electrical equipment.
- Do not touch moving machinery.
- Test for H_2S and wear a harness in the manhole.
- Always be careful.
- Only enter a digester which is declared safe and empty. (7)

3.4
3.4.1 CO_2
3.4.2 CH_4
3.4.3 H_2SO_4
3.4.4 HCl
3.4.5 NH_3

(5 × 2) (10)

3.5
- No expensive equipment
- No disinfection
- Economical to construct and maintain
- Algae growing in the ponds aid in the oxidation process
- Manages settled and unsettled sewage (5)

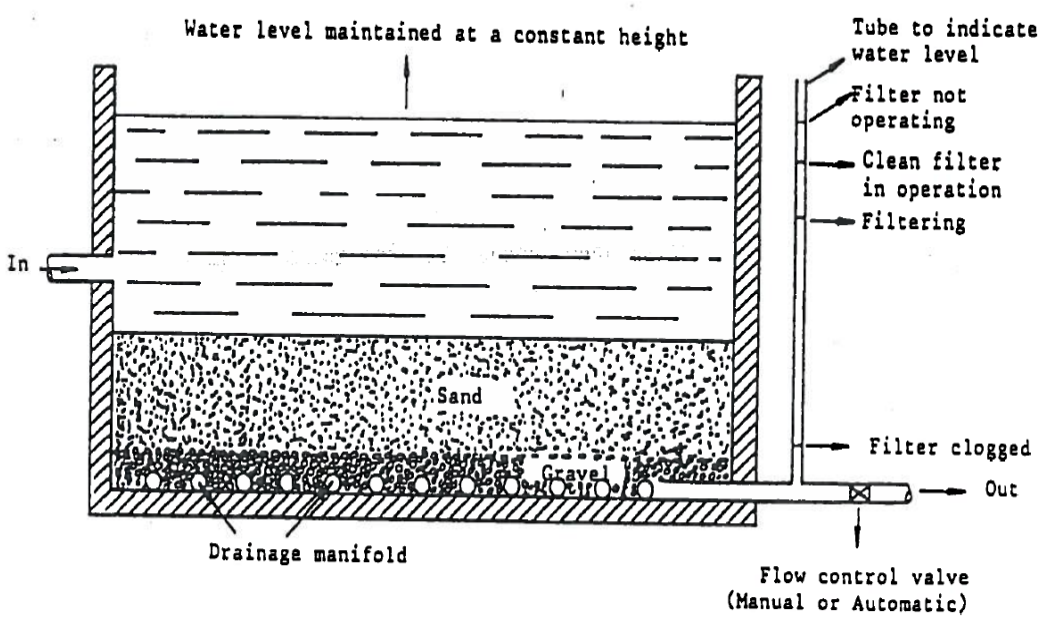
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QUESTION 4

4.1
- Temperature
- pH
- Alkalinity
- Calcium concentration
- Total dissolved solids (5)

4.2
- Safety and first aid equipment
- Colour of starting buttons on machines
- Toilets
- Safety areas
- Parking areas
- Safety instruction signs
- Entrances
- Location of first-aid equipment
- Exits
- Offices etc (Any 5 × 1) (5)

4.3



(ONE mark for each label) (10 × 1) (10)
[20]

TOTAL: 100

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