higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

WASTE-WATER TREATMENT PRACTICE N3

3 AUGUST 2018

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 Work
1.2 Hydraulic gradient
1.3 Brackish water
1.4 Temperature
1.5 Algae or autotrophs

(5 × 2) **[10]**

QUESTION 2

2.1 2.1.1 1 m^3
2.1.2 1 kg
2.1.3 2 000 cm^3

(3 × 2) (6)

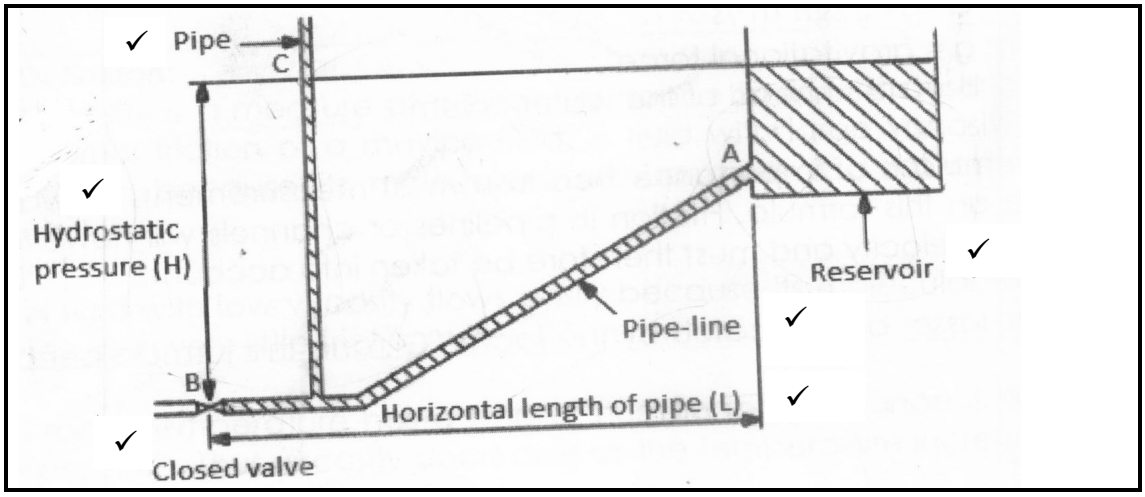
2.2 Relative density = $\frac{mass}{volume}$ ✓

$= \frac{(2000-550)g}{1000ml}$ ✓

$= \frac{(1450)g}{1000ml}$ ✓

$= 1{,}45 g/ml$ ✓ (4)

2.3



HYDROSTATIC PRESSURE (6)

2.4
- Pump not properly primed
- Suction head too high
- Various mechanical faults
- Air leakages
- Too much hot air
- Clogged strainer (Any 4 × 1) (4)

[20]

QUESTION 3

3.1
- Slide valves
- Rotary valves
- Globe valves
- Swing valves (4)

3.2
3.2.1 Cu
3.2.2 Si
3.2.3 Al

(3 × 2) (6)

3.3
- Microscopic counts using a Haemocytometer
- Examining microbial cultures
- Direct counting (counting cells in a known volume) (3)

3.4 It is any discharge by means of a pipeline directly into the sea below water level. (2)

3.5
- Selection of suitable site
- Degree of pretreatment required
- Distance of discharge from shore
- Depth below surface
- Relative capital and operating costs of pipeline
- Prevailing ocean currents
- Distances from beaches
- Tidal effects (Any 5 × 1) (5)

[20]

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QUESTION 4

4.1
- Grease
- Fats
- Roots (3)

4.2
- Domestic sewage contains essential nutrients for biological purification.
- Experience and technology of purification normally rest with the local authority which can handle the task.
- Pretreatment by industry itself leads to a sludge problem and the sludge disposal poses a health risk for the local authority. (6)

4.3
- To protect moving equipment like pumps from abnormal wear due to abrasion
- To prevent sedimentation and subsequent clogging in pipes and channels
- To reduce the frequency of the digester, pump sump and settling tank cleaning, resulting from the accumulation of grit (6)

4.4 Sudden rising of sludge (2)

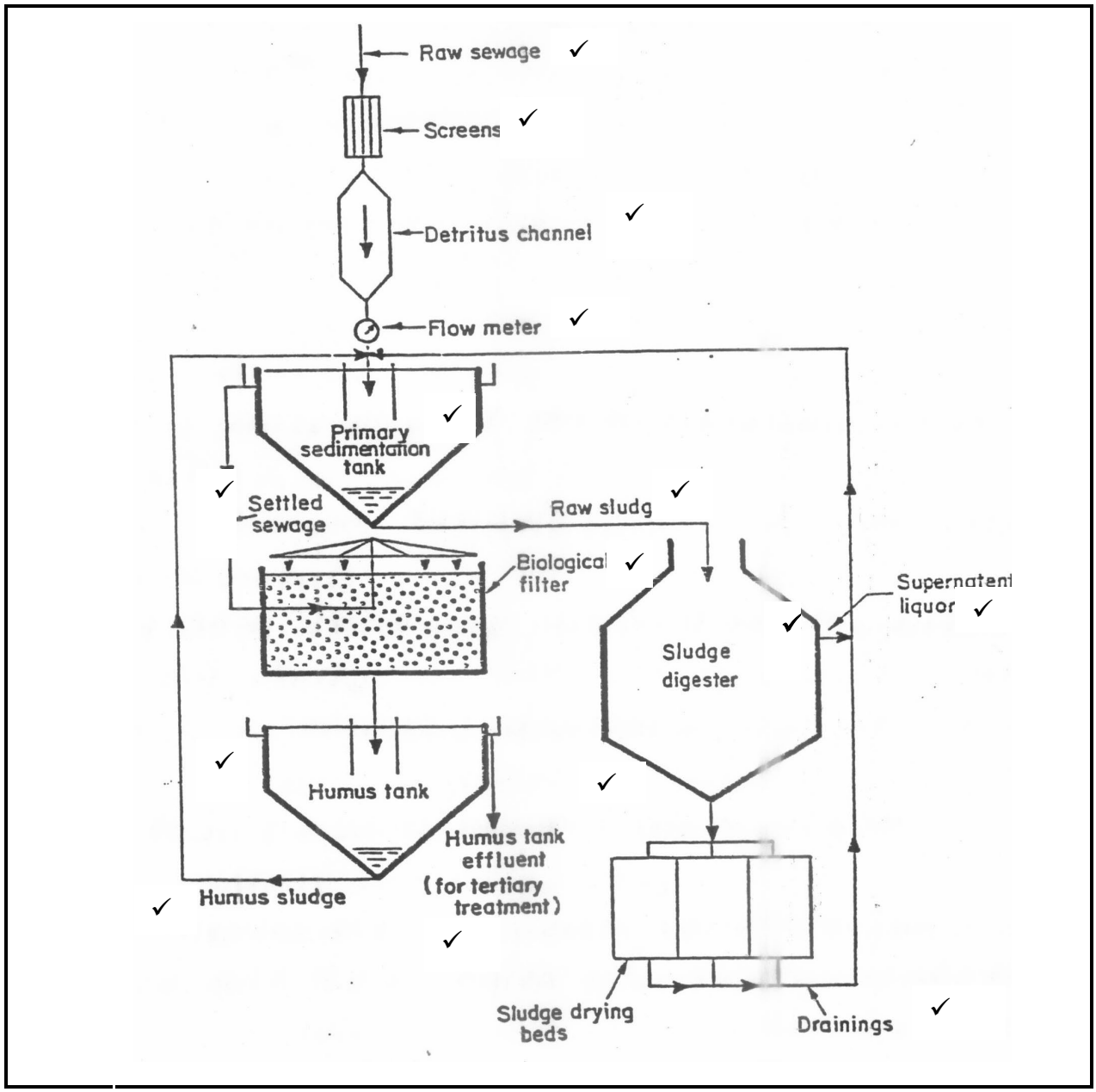
4.5
- Sudden rise in the temperature of the incoming sewage
- Excessive flow
- Inefficient desludging during summer
- Unexpected high load of industrial effluent
- Septic sewage entering the PST upsetting settling and giving rise to floating sludge (5)

4.6
- Bacteria
- Protozoa
- Fungi (3)

[25]

QUESTION 5

5.1



BIOLOGICAL FILTRATION SEWAGE PURIFICATION PLANT (15)

5.2
- High cake solids concentration
- Good filter clarity
- High solids capture
- Low chemical consumption (4)

5.3
- Faulty electricity
- Open flames
- Friction
- Lightning
- Static electricity
- Heated surfaces
- Matches and cigarettes
- Spontaneous ignition
- Chemical reactions (Any 6 × 1) (6)

[25]

TOTAL: 100

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