higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

WASTE-WATER TREATMENT PRACTICE N3

28 November 2022

This marking guideline consists of 6 pages.

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SECTION A

QUESTION 1

1.1 B
1.2 A
1.3 C
1.4 C
1.5 B

(5 × 1) **[5]**

QUESTION 2

2.1 C
2.2 A
2.3 B
2.4 F
2.5 G

(5 × 1) **[5]**

QUESTION 3

3.1 False
3.2 False
3.3 True
3.4 True
3.5 False

(5 × 2) **[10]**

TOTAL SECTION A: 20

SECTION B

QUESTION 4

4.1 $h_g = (h_1 - h_2)/L$ (2)

4.2
- Rotodynamic pumps
- Positive-displacement pumps
- Diaphragm airlift pumps
- Screw pumps (4)

4.3
- Gate valve or sluice
- Check or ping valve
- Globe valve (3)

4.4
- Mostly requires no treatment
- Cheaper than impounding reservoirs
- Not severely affected by drought in the short run. (3)

4.5 4.5.1 Bacteria that derive energy from the sun and inorganic compounds like nitrogen and phosphorus

4.5.2 Organisms that thrive at optimum temperatures of between 8 °C and 10 °C

(2 × 2) (4)

4.6
- Pit latrine
- Night soil bucket
- Chemical closet
- Ventilated improved pit latrine (4)

[20]

QUESTION 5

5.1 Bulking sludge sludge (2)

5.2
- Excessively high oxygen concentration under aeration
- Nutrient efficiency
- Low F/M ratios
- Too low or too high pH values
- High carbohydrates discharge like brewery wastes
- High shock loads
- Septicity of influent sewage causing high sulphide levels
- Plant design (Any 5 × 1) (5)

5.3
- Aeration with compressed air
- Kessener System
- Blowers
- Gravity Aerator
- Simplex system
- Floating aerators
- Brush aerators
- Disc aerators (Any 7 × 1) (7)

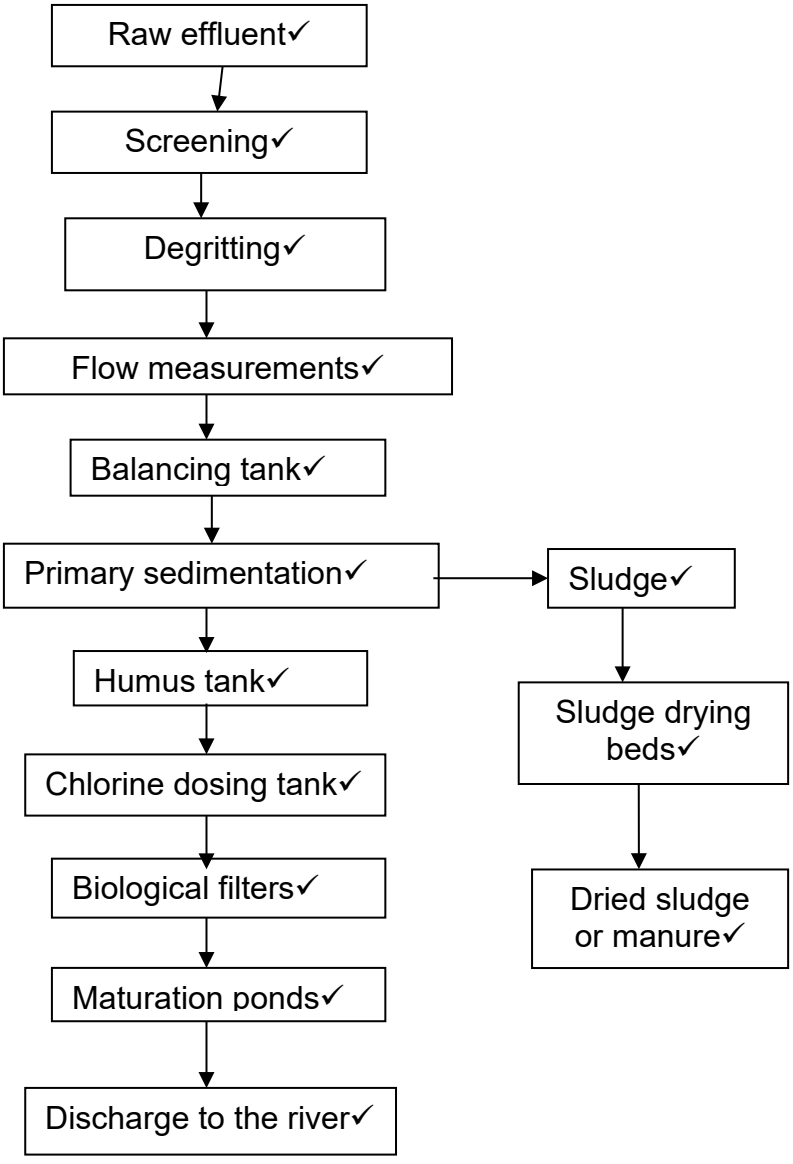
5.4 It is a zone in the activated sludge process that has nitrites and nitrates and there is low dissolved oxygen levels (2)

5.5
- Slow
- Rapid gravity
- Hamlin
- Pressure

(4 × 1) (4)
[20]

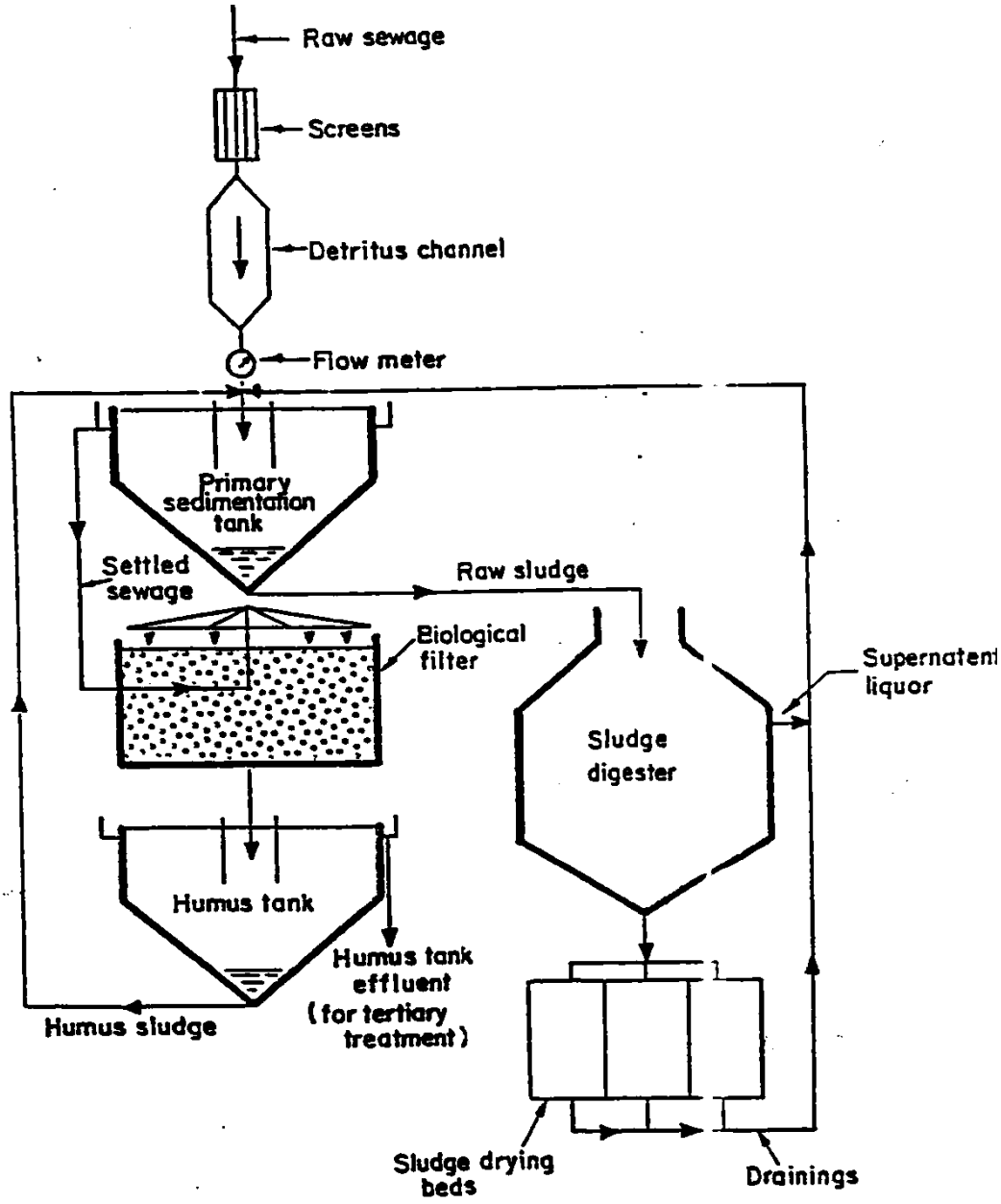
QUESTION 6

6.1



(1 mark for correct flow diagram)

OR



(15)

6.2
- Store full and empty cylinders separately.
- Store away from ventilation inlets.
- Store away from inflammable materials.
- Store away from damp or wet locations.
- Store away from any source of heat or radiation.
- Store away from direct sunlight.
- Store away from steam pipes.
- Store in a well-ventilated area with two exits. (Any 5 × 1) (5)

[20]

QUESTION 7

7.1
- Final polishing of the purified effluent
- Buffer in the event of a plant breakdown (2)

7.2
- No expensive equipment needed
- Algae growing in the ponds aid in the oxidation process
- Economical to construct and maintain
- Able to treat or handle unsettled sewage and settled sewage without problems
- Needs no disinfection (Any 4 × 1) (4)

7.3 The valency of an element is the measure of its combining capacity with other atoms when it forms chemical compounds or molecules. (2)

7.4 Temperature, nitrates and phosphates (Any 2 x1) (2)

7.5
- Zone of degradation
- Zone of active decomposition
- Zone of recovery
- Clear water zone (4 × 2) (8)

7.6
- Relatively odour free
- Readily dewaterable
- Capable of being disposed of without causing nuisance
- Good methane gas formation (Any 2 × 1) (2)

[20]

TOTAL SECTION B: 80
GRAND TOTAL: 100

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