higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

SOIL SCIENCE
NQF LEVEL 2

24 November 2023

This marking guideline consists of 6 pages.

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SECTION A

QUESTION 1

1.1 False
1.2 True
1.3 True
1.4 True
1.5 False
1.6 False
1.7 True
1.8 True
1.9 True
1.10 False

(10 × 1) **[10]**

QUESTION 2

2.1 Mixture
2.2 Transpiration
2.3 Clay
2.4 Water
2.5 Polar covalent bond
2.6 Aspect/Orientation of land
2.7 Deficiency
2.8 Evaporation
2.9 Stimulate
2.10 Negligible

(10 × 1) **[10]**

QUESTION 3

3.1 C
3.2 B
3.3 D
3.4 A
3.5 B
3.6 C
3.7 C
3.8 B
3.9 B
3.10 A

(10 × 1) **[10]**

TOTAL SECTION A: 30

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SECTION B

QUESTION 4

4.1 Soil is the loose material in the upper layer of the earth's surface that serves as a growth medium for plants. (2)

4.2 Solid phase. (1)

4.3 Percentage of organic matter = $\frac{(M2 - M3)}{(M2 - M1)} \times 100$ ✓

$= \frac{(22g - 15g)}{(22g - 2g)} \times 100$ ✓

$= \frac{7g}{20g} \times 100$ ✓

$= 35\%$ ✓ (4)

4.4
4.4.1 R horizon. ✓
4.4.2 B horizon. ✓
4.4.3 O horizon. ✓
4.4.4 C horizon. ✓
4.4.5 A horizon. ✓

(5 × 1) (5)

4.5
- Yellow soil
- Grey soil
- Mottled soil (3)

4.6
4.6.1 Capillarity is upward movement of water through various small pore spaces of soil.

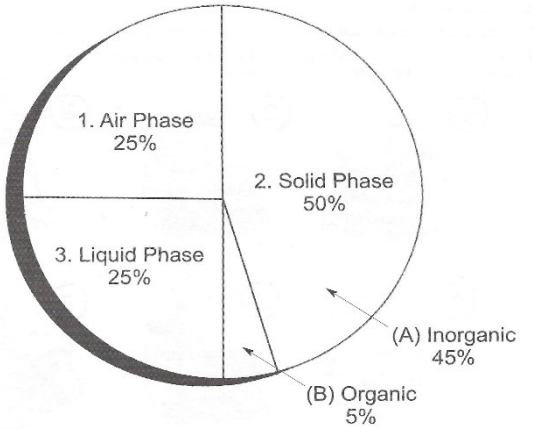
4.6.2 Eluviation is the movement of minerals within the soil from one horizon to another.

4.6.3 Soil profile is a section of the soil that shows all horizons.

4.6.4 Height above sea level.

(4 × 2) (8)

4.7



✓✓✓✓ (4)

4.8 Because if any of these factors in the formula S = F (P, R, Cl, O, T) change, there will be a change in one or the other factors✓✓✓ (3)

[30]

QUESTION 5

5.1 5.1.1 Chlorine (1)

5.1.2 Z (2)

5.1.3 17 (2)

5.1.4 A (2)

5.1.5 Ionic bonding (2)

5.1.6 Ionic bonding is the total transfer of valence electrons from one atom to the other. (2)

5.2 5.2.1 1 – Stirring rod
2 – Mixture of solid and liquid
3 – Funnel
4 – Filter paper traps
5 – Filtrate (liquid component of the mixture) (5)

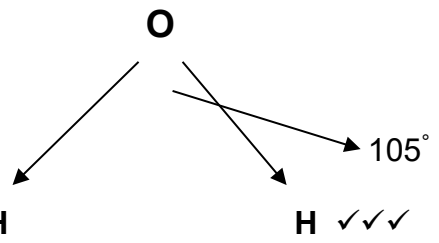
5.2.2 Investigating filtration (1)

5.2.3 Filtration is a way of separating solids from liquids✓ using a filter paper so that only the filtrate or liquid part of the mixture✓ will pass though the filter paper.✓ (3)

5.3
- Protons
- Neutrons
- Electrons (3)

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5.4 5.4.1



✓✓✓ (3)

5.4.2 It is a polar molecule (2)

5.4.3 H_2O (2)

[30]

QUESTION 6

6.1 6.1.1 3 – Growing tip
4 – Root cap
5 – Root hair (3)

6.1.2 Number 4 – the root cap protects the growing tip from being broken during the growing process of the root (2)

6.1.3 1 (1)

6.1.4 Root hairs region (1)

6.2 Suction of plant leaves is created when transpiration takes place and water evaporates through the stomata of leaf. This suction also causes water to move up the xylem vessels and into the leaves of the plant. (3)

6.3
- Diffusion
- Osmosis
- Active transport (3)

6.4 Water (1)

6.5
- Acts as a solvent
- Acts as transport medium
- Agent for chemical reaction
- Keeps cell wall rigid
- Keeps plant temperature stable (5 × 2) (10)

6.6
- Plant leaves have an unnaturally dark green colour✓
- Plants are small✓
- Plant development is very slow✓
- Plants flower poorly✓
- Fewer fruit are formed
- Fewer seeds are formed (Any 4 × 1) (4)

6.7 Available plant nutrients – are those nutrients that can be absorbed by the plants during a particular growing season. (2)
[30]

QUESTION 7

7.1 7.1.1 Diffusion is the movement of molecules from an area of high concentration to an area of low concentration.✓✓
Back diffusion is when water diffuses from moist air back into the leaf when humidity is very high.✓✓

7.1.2 A dry-bulb thermometer measures ordinary atmospheric air.✓✓
A wet-bulb thermometer measures the temperature when exposed to air flow when wrapped by a wet cloth.✓✓

7.1.3 Dew is moisture that we see on the grass in the morning.✓✓
Dew point is the temperature at which condensation starts.✓✓
(4 × 3) (12)

7.2 Relative humidity in the store room is 70% – it means that moisture is 70%✓ of the total moist air✓ that can be held at that temperature in that store room.✓ (3)

7.3 The beaker in front of the fan will have a higher evaporation rate than the beaker that is contained in a large flask / container from which evaporation will be slow.✓ This high evaporation rate is caused by the moving air.✓✓ (3)

7.4 Vaporisation takes place when water boils and changes into water vapour that leaves the water surface after an increase in heat. (2)

7.5
- Stones and pebbles
- Groundcover plants
- Plastic sheeting
- Bark chippings
- Straw
- Newspaper
- Compost (Any 4 × 2) (8)

7.6 Transpiration is the loss of water from the soil through plant leaves. (2)
[30]

TOTAL SECTION B: 120
GRAND TOTAL: 150

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