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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

SOIL SCIENCE
NQF LEVEL 2

8 December 2020

This marking guideline consists of 6 pages.

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SECTION A

QUESTION 1

1.1 C
1.2 D
1.3 D
1.4 C
1.5 A
1.6 A
1.7 C
1.8 A
1.9 A
1.10 D
1.11 B
1.12 B
1.13 C
1.14 A
1.15 D

(15 × 1) **[15]**

QUESTION 2

2.1 False
2.2 True
2.3 True
2.4 True
2.5 False

(5 × 2) **[10]**

QUESTION 3

3.1 D
3.2 I
3.3 G
3.4 F
3.5 B
3.6 A
3.7 K
3.8 C
3.9 H
3.10 E

(10 × 1) **[10]**

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QUESTION 4

4.1 Evaporation
4.2 Accretion
4.3 Mass number
4.4 Suction
4.5 Dew

(5 × 1) **[5]**

TOTAL SECTION A: 40

SECTION B

QUESTION 5

5.1 Reserve nutrients are not immediately available to plants. (2)

5.2 Deoxyribonucleic acid (2)

5.3 Diffusion is the movement of plant nutrients from a higher concentration to a lower concentration. ✓✓ Osmosis is the process by which water molecules move through a permeable membrane from a higher concentration to a lower concentration. ✓✓ (2 + 2) (4)

5.4 5.4.1 Hydrogen is obtained from soil in the form of water.
5.4.2 Carbon is obtained from air in the form of carbon dioxide.
(2 × 1) (2)

5.5 5.5.1 Nitrogen/Phosphorus
5.5.2 Phosphorus
5.5.3 Calcium
5.5.4 Phosphorus
(4 × 2) (8)

5.6 Cation exchange occurs when an adsorbed cation is swapped✓ for another cation to be released✓ from the soil surface to the soil solution✓ where it can be absorbed by plant roots. ✓ (4)

5.7
- Acts as a solvent
- Acts as a transport medium
- Acts as a temperature buffer for plants
- Keeps cells stiff and cell walls rigid
- Agent for chemical reactions (Any 4 × 2) (8)

[30]

QUESTION 6

6.1 6.1.1 Aspect is the direction the slope faces or the orientation of the slope.

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

6.1.3 Illuviation is the deposition, usually in the B-horizon of materials, removed by eluviation from the upper or A-horizon of the soil.

(3 × 2) (6)

6.2 Partly fill the measuring cylinder with dry soil✓and cover the soil in the cylinder with water.✓Air bubbles will rise from the soil as the water level drops. ✓Water will soak into the dry soil replacing the air that is escaping as seen in the form of bubbles to show that dry soil always have air in pore spaces. ✓ (Any 3 × 1) (3)

6.3
- Undecomposed, fibrous organic matter
- Partially decomposed organic matter
- Fully decomposed organic matter (humus) (3)

6.4

6.4.1
- Crumb
- Platy
- Blocky
- Prismatic (4 × 1) (4)

6.4.2
- Crumb: Soil particles arranged in soft spherical aggregates similar to breadcrumbs.
- Platy: Soil particles are arranged into thin, compacted plate-shaped aggregates.
- Blocky:Soil particles form large block-like aggregates.
- Prismatic: Soil particles are arranged in large upright aggregates that stand vertically like columns. (4 × 1) (4)

6.5 6.5.1 Loam sand (2)

6.5.2 Yes (1)

6.5.3 because sweet potatoes grow very well in sandy soil. (1 × 2) (2)

6.5.4 Loam (1 × 2) (2)

[27]

QUESTION 7

7.1 7.1.1
1. Bunsen/Spirit burner
2. Flask
3. One-hole stopper
4. Thermometer
5. Ring stand

(5 × 1) (5)

7.1.2 Condensation (2)

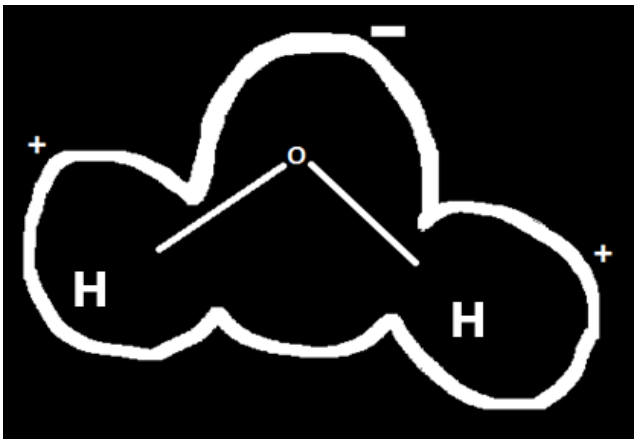
7.1.3 Condensation is the process of changing steam into liquid water. (2)

7.2 7.2.1
- Hydrogen carbonate
- Carbonic acid
- Sodawater (Any 1 × 2) (2)

7.2.2
hydrogen
carbon
oxygen (3 × 1) (3)

7.2.3
H – 2
C – 1
O – 3 (3 × 1) (3)

7.3 **CHEMICAL REACTION OF A WATER-MOLECULE FORMATION**



H: hydrogen
O: oxygen
The line between the atoms indicates covalent bonding which is the sharing of electrons. (5)

7.4 It must lose two electrons.✓ The magnesium atom loses two electrons which are negative and remain with protons which are positive and two more than the amount of electrons.✓✓ (3)

[25]

QUESTION 8

8.1 8.1.1 Relative humidity is the ratio between the amount of water vapour in the air and the amount that the air can hold at that temperature. (2)

8.1.2 A wet-bulb thermometer
A dry-bulb thermometer (2)

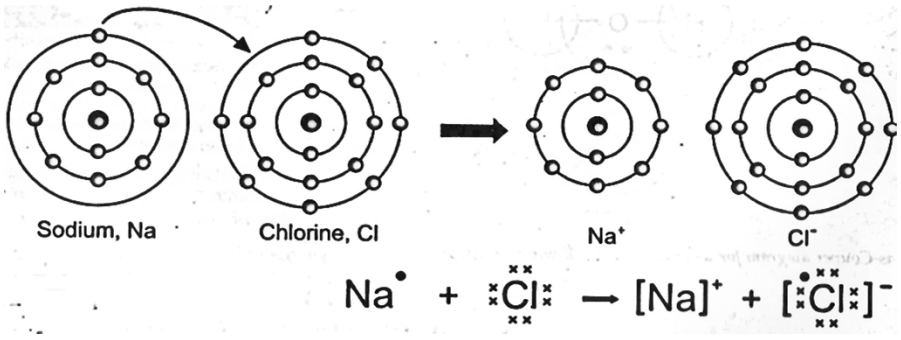
8.1.3 A wet-bulb thermometer is covered by a wet fabric which cools the bulb thermometer by evaporation.
A dry-bulb thermometer is just a bulb thermometer not covered by any fabric. (2)

8.1.4 High humidity leads to fungal diseases and rotting of stored crops or any stored items in the storeroom. (2)

8.1.5
- In the nursery/greenhouse.
- Among the leaves at different heights on trellises. (2)

8.2
- Windbreaks✓ to shelter crops from strong winds✓
- Mulching✓ to cover the surface of the soil to reduce water loss through evaporation✓
- Providing shade✓ to protect crops against the sun by shade cloth or natural shade of trees.✓ (3 × 2) (6)

8.3 **IONISATION OF SODIUM CHLORIDE WHEN IT DISSOLVES IN WATER**



(6)

8.4 8.4.1 An atom is the smallest particle into which an element can be divided.

8.4.2 A mixture is made up of substances not chemically bonded together.

8.4.3 Lewis structure indicates valence electrons in the form of a dot or small cross around the symbol of an atom.

(3 × 2) (6)

[28]

TOTAL SECTION B: 110
GRAND TOTAL: 150

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