higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PHYSICAL SCIENCE
NQF LEVEL 2
(Second paper)

29 November 2024

This marking guideline consists of 6 pages.

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SECTION A

QUESTION 1

1.1 Sharing
1.2 Water
1.3 Less
1.4 Radiation
1.5 Desalination

(5 × 1) **[5]**

QUESTION 2

2.1 False
2.2 False
2.3 True
2.4 False
2.5 False

(5 × 2) **[10]**

QUESTION 3

3.1 E
3.2 G
3.3 C
3.4 F
3.5 B

(5 × 1) **[5]**

QUESTION 4

4.1 C
4.2 C
4.3 C
4.4 C
4.5 D

(5 × 3) **[15]**

TOTAL SECTION A: 35

SECTION B

QUESTION 5:

5.1
5.1.1 Solids are in a fixed position
5.1.2 Solids vibrate or no rotation
5.1.3 Solids have very strong forces
5.1.4 Liquids are fairly close together or take shape of the container
5.1.5 Liquids move faster than solids but slower than gases or vibrate
5.1.6 Liquids have strong forces
5.1.7 Gases are far apart
5.1.8 Gases move very fast or vibrate at higher speed
5.1.9 Gases have weak forces

(9 × 1) (9)

5.2
5.2.1 Semi-metal
5.2.2 Non-metal
5.2.3 Metal

(3 × 2) (6)

5.3
5.3.1 K_2O
5.3.2 $NaC\ell$
5.3.3 $A\ell I_3$

(3 × 2) (6)

5.4 Heterogeneous mixture consists of two or more substances that do not form✓ a uniform mixture.✓ Homogeneous mixture consists of substances that mix✓ together to form a uniform mixture.✓ (4)

[25]

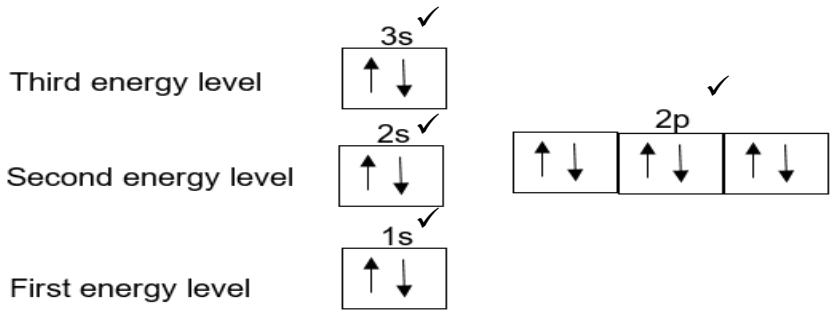
QUESTION 6:

6.1 Magnesium (2)

6.2 12 protons (2)

6.3 $Neutrons\ number = Mass\ number - Protons\ number$✓
$Neutrons\ number = 24 - 12$ ✓
$Neutrons\ number = 12$✓ (4)

6.4



(4)

6.5 Core electrons = 10✓✓
Valence electrons = 2✓✓ (4)
[16]

QUESTION 7:

7.1 $\Delta T = T_2 - T_1$
$\Delta T = 68 - 25$ ✓
$\Delta T = 43^oC$✓ (2)

7.2 $Q = mC_P\Delta T$ ✓
$Q = (0,25)(4187)(43)$✓
$Q = 45010,25$✓ (4)

7.3 7.3.1 Sugar in a powder form is mixed with water. Granules are completely dissolved in water by stirring the solution✓ until granules disappear forming sugar solution.✓ (2)

7.3.2
- No bonds are broken
- No new product is formed
- No permanent transfer of energy
- No permanent change (Any 2 × 2) (4)

7.3.3 Boil the sugar solution until all water has evaporated.✓ White crystal structure remain on the dish. Scrape off crystals to form powder.✓ (2)
[14]

QUESTION 8:

8.1 8.1.1 $2Cl^- \longrightarrow Cl_2 + 2e^-$ (3)

8.1.2 $Cu^{2+} + 2e^- \longrightarrow Cu$ (3)

8.2 8.2.1 $MM_{Mg(OH)_2} = (24) + (16 \times 2) + (1 \times 2)$
$MM_{Mg(OH)_2} = 58\ \frac{g}{mol}$ ✓ (4)

8.2.2 $n = \frac{m}{MM}$✓
$n = \frac{0,05}{58}$✓
$n = 8,62\ mol$✓ (3)

8.3 $m = n \times MM$✓
$m = 2 \times 32$ ✓✓
$m = 64\ g$ ✓ (4)

8.4 8.4.1 $MM_{CaS} = (40) + (32)$ ✓

$MM_{CaS} = 72\ \frac{g}{mol}$ ✓ ✓ (4)

8.4.2 $n = \frac{m}{MM}$ ✓

$n = \frac{0,2}{72}$ ✓

$n = 2,78\ mol$ ✓

$C = \frac{n}{V}$ ✓

$C = \frac{2,78}{0,5}$ ✓

$C = 5,56\ \frac{mol}{dm^3}$ ✓

(6)
[27]

QUESTION 9:

9.1 9.1.1 Stage A: Water from the mountains, valleys and river streams flow downhill to the sea.✓✓
Stage B: Thermal energy from the sun heats water. Water evaporates.✓ Wind moves water vapour upwards. Water vapour rises and gains kinetic energy.✓
Stage C: Water vapour cools and condenses.✓ Clouds form. Wind pushes clouds inland.✓
Stage D: Small droplets form bigger drops.✓ Rain falls and sink into the ground and flows into rivers. Water is used by plants.✓ (8)

9.1.2 Kinetic energy change liquid phase✓ to gas phase✓ (2)

9.2 9.2.1 Industries throw away used and unwanted chemicals into water and onto land.✓ Waste chemicals make water more acidic.✓ (2)

9.2.2 Farmers use fertilisers to replace nutrients lost during harvest season.✓ Rain washes fertiliser from the ground into the river streams.✓ (2)

9.2.3 Human activities include throwing away garbage and generating sewage.✓ Rain washes off human waste into the river streams.✓ (2)

9.2.4 Air pollution mix with water vapour.✓ Particles from various air pollution sources do not dissolve when mixed with water and may form acid rain (2)

9.3 9.3.1
- Raw effluent contaminates river streams
- Affects aquatic life
- Affects live animals and human drinking from river streams

(Any 2 × 1) (2)

9.3.2 To remove large particles✓ at the receiving end that may cause blockage✓ in the pipeline (2)

9.3.3 To remove tiny particles✓ and improve water quality.✓ (2)

9.4 9.4.1
- Tastes nice✓✓
- Good for brewing beer✓✓
- Contains calcium which is good for bones and teeth✓✓
- Scale formed in pipes cuts down on lead and other metals poisoning (Any 3 × 2) (6)

9.4.2 $Ca(HCO_3)_2$ + heat ⟶ $CO_2(g) + H_2O(\ell) + CaCO_3$ (solid) (3)
[33]

TOTAL SECTION B: 115
GRAND TOTAL: 150

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