



Province of the  
**EASTERN CAPE**  
EDUCATION

OR TAMBO INLAND DISTRICT

**GRADE 10**

**PHYSICAL SCIENCES (P2)**

**OCTOBER 2022**

**MARKING GUIDELINES**

**MARKS: 100**



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These marking guidelines consists of 6 pages.

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### QUESTION 1

- 1.1 C✓✓
- 1.2 B✓✓
- 1.3 D✓✓
- 1.4 C✓✓
- 1.5 B✓✓
- 1.6 B✓✓
- 1.7 D✓✓

[14]

### QUESTION 2

- 2.1 Measure of the average kinetic energy of the particles in a substance✓✓ (2)
- 2.2 30°C✓ (1)
- 2.3.1 30-40 minutes ✓ (1)
- 2.3.2 0-5 minutes ✓ (1)
- 2.3.3 5-10✓ and 20-30 minutes ✓ (2)
- 2.3.4 During a phase change the heat energy supplied is used to overcome the intermolecular forces.✓ Therefore the average kinetic energy of the particles remains the same. ✓ (2)

[9]

### QUESTION 3

- 3.1.1 Atoms with the same atomic number ✓but different mass number.✓ (2)
- 3.1.2 Relative atomic mass =  $\frac{(69.5252 \times 60.4) + (70.9249 \times 39.6)}{100}$  ✓  
= 70.08✓ (3)
- 3.1.3 Ga ✓ (1)
- 3.2
  - a) 13✓ (1)
  - b) 13 ✓ (1)
  - c) 13✓ (1)

d) 10✓ (1)

e) 27✓ (1)

3.3.1 8 ✓ (1)

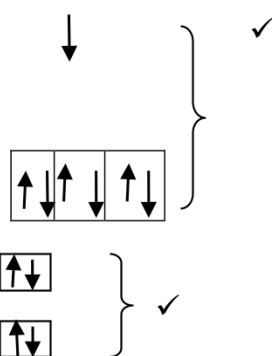
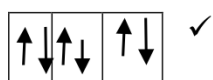
3.3.2 Period -3 ✓ (1)

3.3.3 3 ✓ (1)

3.3.4 Ar ✓ (1)

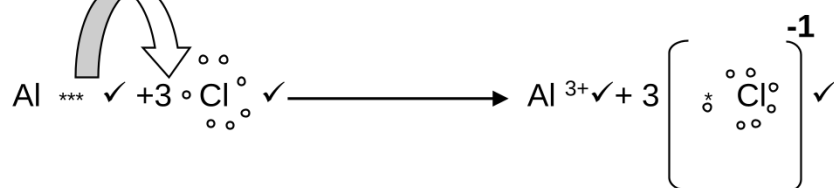
3.4 Ionic bond ✓ (1)

3.5



(3)

3.6



(4)

#### QUESTION 4

4.1.1 Mg ✓

4.1.2 O ✓

4.1.3 H ✓

4.1.4 F ✓

4.1.5 Si ✓ (5)

4.2.1 Energy released when an electron is added to an atom in the gaseous state to form an anion. ✓✓ (2)

4.2.2  $\text{Cl} + \text{e}^- \rightarrow \text{Cl}^- + 349 \text{ kJ mol}^{-1}$  ✓ (2)

4.3 Ionisation energy ✓ (1)

4.4.1  $\text{Li}_2\text{O}$  ✓✓ (2)

4.4.2  $\text{CaF}_2$  ✓✓ (2)

[14]

#### QUESTION 5

5.1 Copper(I) oxide. ✓✓ (2)

5.2 Synthesis reaction ✓ (1)

5.3  $(4 \times 63.5) + (2 \times 16) \checkmark = (4 \times 63.5) + (2 \times 16) \checkmark$   
 $286 \text{ g.mol}^{-1} = 286 \text{ g.mol}^{-1} \checkmark$  (3)

5.4.1 Number of moles of the solute per litre of the solution. ✓✓ (2)

5.4.2  $n = \frac{m}{M} \checkmark = \frac{20}{63.5} \checkmark = 0.3149 \text{ mole}$

$n(\text{HCl}) = 2 \times 0.3149 = 0.6299 \text{ mole} \checkmark$

$c = \frac{n}{V} \checkmark$

$c = \frac{0.6299}{0.25} \checkmark = 2.59 \text{ mol.dm}^{-3} \checkmark$

(6)

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### QUESTION 6

- 6.1 Experiment 1 ✓ (1)
- 6.2 New substances are formed ✓ / Bonds are broken and new bonds are formed (1)
- 6.3  $\text{Fe}_{(s)} + \text{S}_{(s)} \longrightarrow \text{FeS}_{(s)}$  ✓ Balancing ✓ (3)
- 6.4 Separate the iron filings using a magnet ✓ (1)

**[6]**

### QUESTION 7

- 7.1  $\text{O}_2$  ✓ (1)

- 7.2  $\begin{array}{c} \circ \circ \\ \text{O} \\ \circ \circ \end{array} : : \begin{array}{c} \circ \circ \\ \text{O} \\ \circ \circ \end{array}$  6 valence electrons ✓  
Sharing 2 pairs ✓ (2)

- 7.3.1  $n = \frac{m}{M} \checkmark = \frac{10}{32} \checkmark = 0.3125 \text{ moles} \checkmark$  (3)

- 7.3.2  $n(\text{SO}_3) \text{ produced} = 2 \times 0.3125 \checkmark = 0.625 \text{ moles}$   
 $m(\text{SO}_3) \text{ produced} = n \times M \checkmark = 0.625 \times 80 \checkmark = 50\text{g} \checkmark$  (4)

- 7.3.3  $\% \text{ yield} = \frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100 \checkmark = \frac{40}{50} \times 100 \checkmark = 80\% \checkmark$  (3)

**[13]**

### QUESTION 8

8.1 The simplest whole number ratio of elements in a compound. ✓✓ (2)

8.2

Element	g/100g	n = m/M	Simplest ratio
Na	43.39	$43.39 / 23 = 1.8867$ ✓	2
C	11.32	$11.32 / 12 = 0.9433$ ✓	1
O	45.28	$45.28 / 16 = 2.83$ ✓	3

Empirical formula is  $\text{Na}_2\text{CO}_3$  ✓ (5)

[7]

[TOTAL 100 MARKS]