

**GAUTENG DEPARTMENT OF EDUCATION /
GAUTENGSE DEPARTEMENT VAN ONDERWYS
PROVINCIAL EXAMINATION / PROVINSIALE EKSAMEN
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GRADE / GRAAD 10**

**PHYSICAL SCIENCES /
FISIESE WETENSKAPPE
(PAPER/VRAESTEL 2)**

MEMORANDUM

8 pages

**GAUTENG DEPARTMENT OF EDUCATION /
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**PHYSICAL SCIENCES P2/
FISIESE WETENSKAPPE V2**

QUESTION 1 / VRAAG 1

- 1.1 B ✓✓
1.2 A ✓✓
1.3 A ✓✓
1.4 D ✓✓
1.5 C ✓✓
1.6 A ✓✓
1.7 C ✓✓
1.8 C ✓✓
1.9 C ✓✓
1.10 A ✓✓

[20]

QUESTION 2 / VRAAG 2

**Definitions: all or nothing
Definisies: alles of niks**

- 2.1
2.1.1 Heterogenous mixture consists of substances that are visibly different or are in different phases. ✓✓

OR

A mixture with distinguishable particles that are not in the same phase. ✓✓

A (Oil & water)

✓ any one

B (Sand & water)

If learner did not use examples from given mixtures mark incorrect

Heterogeniese mengsel wat bestaan uit stowwe wat duidelik verskillend voorkom of in verskillende fases is ✓✓

OF

'n Mengsel met onderskeibare deeltjies wat nie in dieselfde fase is nie ✓✓

A (Olie & water)

✓ enige

B (Sand & Water)

een

Indien 'n leerder nie die gegewe voorbeelde van mengsels gegee het nie, merk verkeerd

(3)

- 2.1.2 Homogenous mixtures are substances that are evenly distributed throughout the mixture. ✓✓

OF

A mixture where the component particles are all in the same phase. ✓✓

C (Oros & water)

✓ any

D (Salt & water)

one

If learner did not use examples from given mixtures mark incorrect

Homogeniese mengsel is waar stowwe eweredig versprei is deur die mengsel. ✓✓

OF

'n Mengsel waar deeltjies almal in dieselfde fase is. ✓✓

C (Oros & water)

D (Salt & water)

✓ enige

Indien 'n leerder nie die gegewe voorbeelde van mengsels gegee het nie, merk verkeerd

(3)

2.2 2.2.1 Filtration / Filtrering ✓

2.2.2 Evaporation / Verdamping ✓

Heating – incorrect
Verhitting - verkeerd

(1)

(1)

2.3 Use a magnet ✓ to remove the iron filings from the sulphur powder. Iron is magnetic and sulphur is non-magnetic. The iron will be attracted to the magnet and the sulphur will not be attracted ✓

Gebruik 'n magneet ✓ om ystervylsels vanuit swawelpoeier te verwyder. Yster is magneties en swawel is nie-magneties. Die yster sal aangetrek word en die swawel nie ✓

(2)

[10]

QUESTION 3 / VRAAG 3

3.1 To investigate the heating curve of water ✓✓ / Om die verhittingskurwe van water te ondersoek ✓ (2)

3.2

3.2.1 DE ✓

(1)

3.2.2 BC ✓

(1)

3.2.3 AB ✓

(1)

3.3

3.3.1 * Constant increase in temperature ✓

* Strong intermolecular forces of attraction ✓

* Average kinetic energy is (very) low OR increasing as temperature increases OR average kinetic energy increase gradually ✓ (3)

• *Konstante verhoging in temperatuur* ✓

• *Sterk intermolekulêre kragte teenwoordig* ✓

• *Gemiddelde kinetiese energie is (baie) laag OF verhoog soos temperatuur verhoog OF gemiddelde kinetiese energie verhoog stelselmatig* ✓ (3)

3.3.2. * Temperature increase constantly ✓

* The intermolecular forces between the particles are extremely. ✓

* As the temperature increases, the average kinetic energy of the molecules increases. ✓ (3)

• *Temperatuur verhoog geredelik* ✓

• *Die intermolekulêre kragte tussen die deeltjies is swak en die deeltjies beweeg ver van mekaar* ✓

• *Soos die temperatuur verhoog, verhoog die gemiddelde kinetiese energie van die molekules* ✓ (3)

3.4 [ANY PHASE – ANY 3]

(3)

Solid	Liquid	Gas
<ul style="list-style-type: none"> Definite shape Definite volume Resists forces that try to change volume & shape Small spaces between particles Spaces between particles are larger than expected due to hydrogen bonding (water). Orderly arrangement of particles Particles only vibrate. Very strong forces between particles 	<ul style="list-style-type: none"> Definite volume Changes shape Flows & takes shape of container Small spaces between particles Particles move in orderly manner. Collisions between particles Forces between particles 	<ul style="list-style-type: none"> No definite volume No definite shape Gases expand to fill container Big open spaces between particles Particles move quickly. Intense collisions occur between particles. Movement is random. Weak/no forces between particles

[ENIGE FASE – ENIGE 3]

Solied	Vloeistof	Gas
<ul style="list-style-type: none"> <i>Definitiewe vorm</i> <i>Definitiewe volume</i> <i>Weerstaan kragte wat volume en vorm wil verander</i> <i>Klein spasies tussen deeltjies</i> <i>Spasies tussen deeltjies is groter as verwag a.g.v. waterstofbinding (vir water).</i> <i>Ordelijke rangskikking van deeltjies</i> <i>Deeltjies vibreer slegs.</i> <i>Baie sterk kragte tussen deeltjies</i> 	<ul style="list-style-type: none"> <i>Definitiewe vorm</i> <i>Verander volume</i> <i>Vloei en neem vorm van houer aan</i> <i>Klein spasies tussen deeltjies</i> <i>Deeltjies beweeg in ordelike wyse.</i> <i>Botsings tussen deeltjies</i> <i>Kragte tussen deeltjies</i> 	<ul style="list-style-type: none"> <i>Geen definitiewe vorm</i> <i>Geen definitiewe volume</i> <i>Gasse sit uit om houer te vul</i> <i>Groot spasies tussen deeltjies</i> <i>Deeltjies beweeg vinnig.</i> <i>Intense botsings tussen deeltjies</i> <i>Vrye beweging.</i> <i>Swak / geen kragte tussen deeltjies</i>

[14]

QUESTION 4 / VRAAG 4

4.1

- 4.1.1 NaCl crystals / NaCl kristalle ✓✓ (2)
 4.1.2 Copper metal / Kopermetaal ✓✓ (2)
 4.1.3 Plastic / Plastiek ✓✓ (2)
 4.1.4 Air (we breath) / Lug (wat ons inasem) ✓✓ (2)

4.2

- 4.2.1 Carbon / Koolstof ✓ (1)

4.2.2 Carbon has four (4) valence electrons; therefore can form four covalent bonds. In a diamond, each of the valence electrons forms covalent bonds with four other atoms of carbon. ✓ There are no free electrons therefore no charge can flow. ✓ (2)

Koolstof het vier (4) valenselektrone, dus vorm dit vier kovalente bindings. In 'n diamant, bind elke valenselektron met 4 koolstofatome. ✓ Daarom is daar geen vry elektrone, dus vloei geen lading. ✓ (2)

- 4.2.3 Graphite: ✓ Carbon atoms covalently bonded to 3 other carbon atoms to form rings ✓
 Where electrons in rings become delocalised ✓ and are free to move to conduct electrical current. ✓ (4)

Grafiët: ✓; Koolstofatome is kovalent gebind aan 3 ander atome om ringstrukture te maak ✓ waar elektrone dan gedelokaliseerd is ✓ en vry is om rond te beweeg en sodoende elektriese lading te geleiv ✓ (4)

[8]

QUESTION 5 / VRAAG 5

- 5.1 5 (Five / Vyf) ✓ (1)

- 5.2 3 (Three / Drie) ✓ (1)

- 5.3 Pauli's exclusion principle ✓: Each orbital must have a maximum of 2 electrons ✓ and must spin in opposite directions ✓.
 Hund's rule ✓: Orbitals of identical energy are available, electrons are placed in individual orbitals ✓ before they are paired ✓.

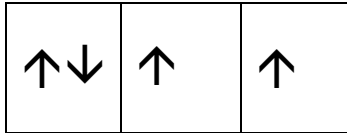
Pauli se uitsluitbeginsel ✓ : Elke orbital het 'n maksimum van 2 elektrone ✓ en spin in teenoorgestelde rigtings ✓

Hund se reël ✓ : Orbitale met identiese energie is beskikbaar, die elektrone word in individuele orbitale geplaas ✓, voordat dit afgepaar word ✓ (6)

- 5.4 Oxygen / Suurstof ✓ (1)

Accept: D
 Aanvaar: D

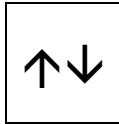
5.5 2p



Negative marking
Negatiewe merk

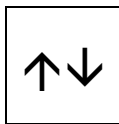
(3)

2s



- ✓ In opposite direction ($\uparrow\downarrow$ or $\downarrow\uparrow$)
- ✓ 1s, 2s, 2p must be present
- ✓ 8 electrons / arrows in correct orbitals

1s



- ✓ In teenoorgestelde rigting wees ($\uparrow\downarrow$ of $\downarrow\uparrow$)
- ✓ 1s, 2s, 2p moet teenwoordig wees
- ✓ 8 elektrone / pyltjies in korrekte orbitale

5.6 $1s^2 2s^2 2p^6 3s^2 3p^6$
 $1s^2$ ✓
 $3s^2; 3p^6$ ✓

 $2s^2; 2p^6$ ✓
 ✓ correct number of electrons
 ✓ korrekte aantal elektrone
(4)
[16]**QUESTION 6 / VRAAG 6**

6.1 Neutrons / Neutrone ✓

(1)

$$6.2 \left(\frac{(88,48 \times 20) + (0,27 \times 21) + (11,25 \times 22)}{100} \right) = A_r$$

$$A_r = 20,2277 \text{ OR / OF}$$

$$A_r = 20,23 \text{ ✓}$$

(3)
[4]

QUESTION 7 / VRAAG 7

- 7.1 Colour change ✓
 Forming a gas ✓
 Forming a solid OR precipitation ✓
 Change in temperature (release or absorption of heat) ✓
 A new substance is formed ✓
 The chemical nature of a substance is changed ✓
 A change in the potential energy of the substance ✓
 New properties ✓

Any 4

- Kleurverandering* ✓
Vorming van 'n gas ✓
Vorming van 'n solied OF presipitasie ✓
Verandering in temperatuur (vrystel of absorpsie van hitte) ✓
'n Nuwe substans / stof word gevorm ✓
Die chemiese geaardheid van die stof word verander ✓
'n Verandering in die potensiële energie van die substans ✓
Nuwe eienskappe ✓

Enige 4

(4)

- 7.2 Decomposition reaction is when a substance breaks up into at least two other substances. ✓✓
 A synthesis reaction is when at least two substances form a new substance. ✓✓

- Ontbindingsreaksie is waar 'n stof opbreek in ten minste twee ander stowwe.* ✓✓
Sintese reaksie is waar ten minste twee stowwe saam 'n nuwe stof vorm. ✓✓

(4)

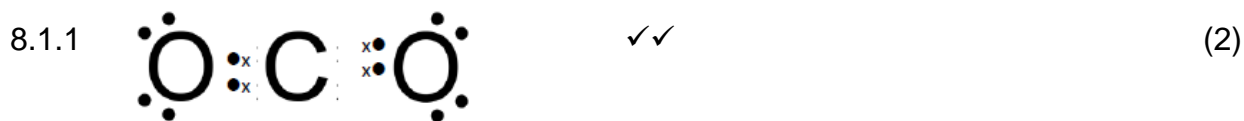
- 7.3 7.3.1 Physical Change ✓ / Fisiese verandering ✓
 7.3.2 Chemical Change ✓ / Chemiese verandering ✓
 7.3.3 Chemical Change ✓ / Chemiese verandering ✓
 7.3.4 Physical Change ✓ / Fisiese verandering ✓

(4)

[12]

QUESTION 8 / VRAAG 8

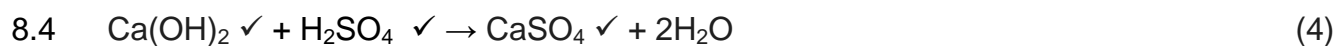
8.1



8.2



Left balanced ✓ Right balanced ✓ Links gebalanseerd ✓ Regs gebalanseerd ✓
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Equation balanced ✓ *Vergelyking gebalanseerd* ✓

8.5

