GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

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

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PROVINCIAL EXAMINATION / *PROVINSIALE EKSAMEN*

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)
B (Sand & water)
✓ any one

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)
B (Sand & Water)
✓ enige 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)
D (Salt & water)
✓ any 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* ✓ (1)
2.2.2 Evaporation / *Verdamping* ✓ (1)

Heating – incorrect
Verhitting - verkeerd

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

Gebruik 'n magneet ✓om ystervylsels vanuit swawelpoeier te verwyder. Yster is magneties en swawel is nie-magneties. <u>Die yster sal aangetrek word en die swawel nie</u> ✓
(2)
[**10]**

QUESTION 3 / *VRAAG 3*

3.1 To investigate the <u>heating curve of water</u> ✓✓/ *Om die <u>verhittingskurwe van water</u> 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 OFverhoog soos temperatuur verhoog OF gemiddelde kinetiese enrgie 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**
• 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	• Definite volume • Changes shape • Flows & takes shape of container • Small spaces between particles • Particles move in orderly manner. • Collisions between particles • Forces between particles	• 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***
• *Definitiewe vorm* • *Definitiewe volume* • *Weerstaan kragte wat volume en vorm wil verander* • *Klein spasies tussen deeltjies* • *Spasies tussen deeltjies is groter as verwag a.g.v. waterstofbinding (vir water).* • *Ordelike rangskikking van deeltjies* • *Deeltjies vibreer slegs.* • *Baie sterk kragte tussen deeltjies*	• *Definitiewe vorm* • *Verander volume* • *Vloei en neem vorm van houer aan* • *Klein spasies tussen deeltjies* • *Deeltjies beweeg in ordelike wyse.* • *Botsings tussen deeltjies* • *Kragte tussen deeltjies*	• *Geen definitiewe vorm* • *Geen definitiewe volume* • *Gasse sit uit om houer te vul* • *Groot spasies tussen deeltjies* • *Deeltjies beweeg vinnig.* • *Intense botsings tussen deeltjies* • *Vrye beweging.* • *Swak / geen kragte tussen deeltjies*

[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)

Not to be marked
Moet nie gemerk word

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)

Grafiet: ✓; 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 gelei✓ (4)
[8]

QUESTION 5 / *VRAAG 5*

5.1 5 (Five / *Vyf*) ✓ (1)

5.2 3 (Three / *Drie*) ✓ (1)

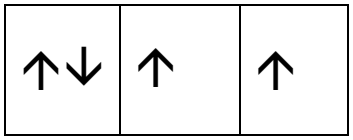
5.3 Pauli's exclusion principle✓: Each orbital must have a maximum of 2 electrons ✓and must spin in opposite directions✓.
Hund's rule✓: Orbitals of identical energy are available, electrons are placed in individual orbitals✓ before they are paired✓.

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

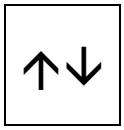
5.5 2p



Negative marking
Negatiewe merk

(3)

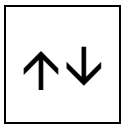
2s



✓In opposite direction (↑↓ or ↓↑)
✓1s, 2s, 2p must be present
✓8 electrons / arrows in correct orbitals

✓*In teenoorgestelde rigting wees (↑↓ of ↓↑)*
✓*1s, 2s, 2p moet teenwoordig wees*
✓*8 elektrone / pyltjies in korrekte orbitale*

1s



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

A_r = 20,2277 OR / *OF*
A_r = 20,23 ✓

(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* ✓

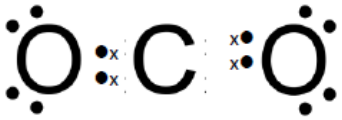
7.3.3 Chemical Change ✓ / *Chemiese verandering* ✓

7.3.4 Physical Change ✓ / *Fisiese verandering* ✓ (4)

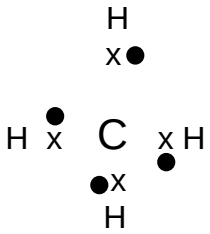
[12]

QUESTION 8 / *VRAAG 8*

8.1

8.1.1  ✓✓ (2)

8.1.2 $[Na]^+$ ✓ (1)

8.1.3  ✓ (1)

8.2

8.2.1 NH_3 ✓ (1)

8.2.2 CO_3^{-2} ✓ (1)

8.3 $2NaHCO_3$ ✓ → $Na_2CO_3 + H_2O + CO_2$ ✓ (2)

Left balanced ✓
Right balanced✓
Links gebalanseerd✓
Regs gebalanseerd✓

8.4 $Ca(OH)_2$ ✓ + H_2SO_4 ✓ → $CaSO_4$ ✓ + $2H_2O$ (4)

Equation balanced ✓ *Vergelyking gebalanseerd* ✓

8.5

8.5.1 Iron(III)chloride / *Yster(III)chloried* ✓✓
(Accept: Ferric chloride) (2)

8.5.2 Potassium permangenate / *Kaliumpermangenaat* ✓✓ (2)

[16]