



education

Department of
Education
FREE STATE PROVINCE

GRADE/GRAAD 10

PHYSICAL SCIENCES: PHYSICS & CHEMISTRY
FISIESE WETENSKAPPE: FISIKA & CHEMIE

JUNE/JUNIE 2016

MARKS/PUNTE: 150

MEMORANDUM

This memorandum consists of 10 pages.
Hierdie memorandum bestaan uit 10 bladsye.

QUESTION 1/VRAAG 1

- 1.1 C ✓✓ (2)
1.2 C ✓✓ (2)
1.3 D ✓✓ (2)
1.4 A ✓✓ (2)
1.5 D ✓✓ (2)
1.6 B ✓✓ (2)
1.7 C ✓✓ (2)
1.8 B ✓✓ (2)
1.9 C ✓✓ (2)
1.10 D ✓✓ (2)
[20]

QUESTION 2/VRAAG 2

- 2.1
2.1.1 **Any TWO/Enige TWEE**
Salt solution/Soutoplossing ✓ Addition: Paper clip (Could be made from steel.)
Air/Lug ✓ Byvoeging: Skuifspeld (Kan van staal gemaak wees.)
Vinegar/Asyn
~~Granite counter top/Graniettoonbankblad~~ (2)
2.1.2 Ice water/yswater ✓
Bean soup/Boontjiesop ✓ Granite counter top/Graniettoonbankblad (2)
2.1.3 Sugar/Suiker ✓
Bicarbonate of soda/Koeksoda ✓ (2)
2.1.4 Paper clip/Skuifspeld ✓ Keep paper clip here (could be made of pure copper eg).
Graphite/Grafiet ✓ Behou skuifspeld hier (kan bv. van suiwer koper gemaak wees). (2)
2.1.5 Sodium bicarbonate/Natriumbikarbonaat ✓ (1)
2.1.6 Graphite/Grafiet ✓ (1)
2.2
2.2.1 Metallic bond/Metaalbinding ✓ (1)
2.2.2 Attraction between positive ions/nuclei ✓ and delocalised valence electrons. ✓
Aantrekking tussen positiewe ione/kerne en gedelokaliseerde valenselektrone. (2)
[13]

QUESTION 3/VRAAG 3

- 3.1 Flourine/*Fluoor* ✓ (1)
- 3.2 Argon ✓ (1)
- 3.3 Hydrogen/*Waterstof* ✓ (1)
- 3.4 Nitrogen/*Stikstof* ✓ (1)
- 3.5 Hydrogen/*Waterstof* ✓ (1)
- 3.6 Argon ✓ (1)
- 3.7 Sulphur/*Swawel* ✓ (1)
- 3.8 Beryllium/*Berillium* ✓ (1)
- 3.9 Boron/*Boor* ✓ (1)
- 3.10 Bromine/*Broom* ✓ (1)
- [10]**

QUESTION 4/VRAAG 4

- 4.1
- 4.1.1 Atoms of the same element with the same number of protons/atomic number ✓ but a different number of neutrons. ✓
Atome van dieselfde element met dieselfde getal protone/atoomgetal maar verskillende getalle neutrone. (2)
- 4.1.2
- Same number of protons/Same atomic number ✓
Dieselfde getal protone/Dieselfde atoomgetal
 - Same number of electrons ✓ / *Dieselfde getal elektrone* (2)
- 4.1.3 Same ✓ / *Dieselfde*
Same number of (valence) electrons. ✓
Dieselfde getal (valens) elektrone. (2)
- 4.1.4 $1s^1$ ✓ (1)
- 4.2
- 4.2.1 36 ✓ (1)
- 4.2.2
- $$\begin{aligned} M_r &= \frac{69,2(63) + 30,8(65)}{100} \\ &= 63,62 \end{aligned}$$
- (4)
[12]

QUESTION 5/VRAAG 5

5.1

5.1.1 $(\text{NH}_4)_2\text{SO}_4$ ✓ (2)

5.1.2 KMnO_4 ✓ (2)

5.2



Marking criteria/Nasienriglyne:	
Four electron pairs around O atom./Vier elektronpare rondom O-atoom.	✓
Two H atoms share one electron pair each with O atom./Twee H-atome deel een elektronpaar elk met die O-atoom.	✓

(2)

5.3

5.3.1 Table salt/Tafelsout ✓ (1)

5.3.2 Mass cannot be created or destroyed./The total mass of reactants equals the total of products. ✓✓ **(2 marks or zero)**
Massa kan nie geskep of vernietig word nie./Die totale massa van reaktanse is gelyk aan die totale massa van produkte.
(2 punte of nul) (2)

5.3.3 Mass reactants/Massa reaktans) = $84 \checkmark + 36,5 \checkmark$
 $= 120,5 \text{ g}$
 Mass products/Massa produkte = $58,5 \checkmark + 44 \checkmark + 18 \checkmark$
 $= 120,5 \text{ g}$ } ✓ Both answers/Beide antwoorde (6)
[15]

QUESTION 6/VRAAG 6

6.1

6.1.1 Tripod/(Driepoot)staander ✓ (1)

6.1.2 Bunsen burner/Bunsenbrander ✓ (1)

6.2

6.2.1 MgO ✓ (1)

6.2.2 Ionic/Ionies ✓ (1)

6.2.3 (Positive and negative) ions/(Positiewe en negatiewe) ione ✓ (1)

6.2.4 Ionic bonding/Ioniese binding ✓ (1)

6.3

6.3.1 Synthesis/Sintese ✓
 Two reactants react to form one product. ✓
Twee reaktanse reageer om een produk te vorm. (2)

6.3.2 Exothermic/Eksotermies ✓

Heat is given off./Energy is released. ✓
Hitte word afgegee./Energie word vrygestel.

(2)

6.4

6.4.1 Oxygen from the atmosphere ✓

combines with magnesium to form magnesium oxide. ✓
*Suurstof uit die atmosfeer
verbind met magnesium om magnesiumoksied te vorm.*

(2)

6.4.2 $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ ✓ Bal. ✓

Notes/Aantekeninge

- Reactants ✓ Products ✓ Balancing ✓
Reaktanse Produkte Balansering
- Ignore/Ignoreer ↔ and phases/en fases
- Marking rule 6.3.10/Nasienreël 6.3.10

(3)

[15]

QUESTION 7/VRAAG 7

7.1

7.1.1 Phase change (directly) from solid to gas. ✓✓ **(2 marks or zero)**

Fase verandering (direkte) van vastestof na gas. (2 punte of nul) (2)

7.1.2 (a) Molecular (structure) /Molekulêre (struktuur) ✓

(1)

(b) Molecules/Molekule ✓

(1)

(c) Intermolecular forces/Intermolekulêre kragte ✓

(1)

7.2 Due to the higher temperature outside:

Particles have higher average kinetic energy./Particles vibrate (move) faster. ✓

Forces of attraction (between molecules) become weaker. ✓

Regular pattern (structure) is broken./Phase change starts to take place. ✓

As gevolg van die hoër temperatuur buite:

Deeltjies het hoër gemiddelde kinetiese energie./Deeltjies vibreer (beweeg) vinniger.

Aantrekkingskragte (tussen molekule) word swakker.

Reëlmatige patroon (struktuur) breek./Fase verandering begin plaas vind.

(3)

7.3

7.3.1 0 °C ✓

(1)

7.3.2 100 °C ✓

(1)

7.3.2 (a) Melting/Smelt ✓

(1)

(b) Boiling/Kook ✓

(1)

7.3.3 (a) Gas ✓ (1)

(b) Liquid/Vloeistof ✓ (1)

7.3.4 Substance 1/Stof 1 ✓

Water is a solid at temperatures less than 0 °C./Boiling point of water is at 97 - 100 °C. ✓

Water is 'n vastestof by temperature minder as 0 °C./Kookpunt van water is by 97-100 °C.

(2)
[16]

QUESTION 8/VRAAG 8

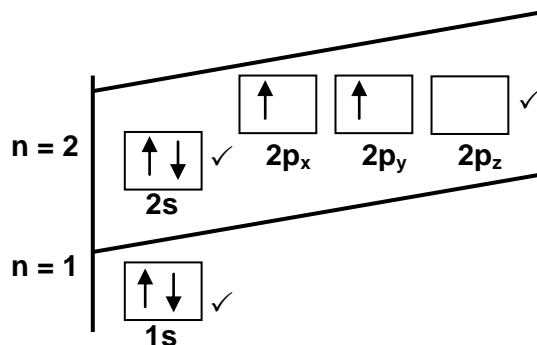
8.1 Giant lattice ✓ consisting of atoms. ✓
Reuse rooster bestaande uit atome.

(2)

8.2 Covalent bonds/Kovalente bindings ✓

(1)

8.3



Marking criteria/Nasienriglyne	
Two paired electrons showing opposite spin in the 1 s orbital. <i>Twee gepaarde elektrone met teenoorgestelde spin in 1s-orbitaal.</i>	✓
Two paired electrons showing opposite spin in the 2 s orbital. <i>Twee gepaarde elektrone met teenoorgestelde spin in 2s-orbitaal.</i>	✓
Two unpaired electrons in each of 2 p orbitals. <i>Twee ongepaarde elektrone in elk van twee p-orbitale.</i>	✓

(3)

8.4 Non-metal/Niemetaal ✓

(1)
[7]

QUESTION 9/VRAAG 9

9.1

9.1.1 Longitudinal (wave)/Longitudinale golf ✓

Transplanted as compressions and rarefactions. ✓

Voortgeplant as verdichtings en verdunnings.

(2)

9.1.2 (a) X ✓

(1)

(b) 25 cm ✓

(1)

9.1.3 (a)

•	
$T = \frac{0,75}{1,5} \checkmark = 0,5 \text{ s}$ $f = \frac{1}{T} \checkmark$ $= \frac{1}{0,5} \checkmark$ $= 2 \text{ Hz} \checkmark$	Marking criteria/Nasienriglyne <ul style="list-style-type: none"> Time divide by 1,5. ✓ Tyd gedeel deur 1,5. Formula/Formule ✓ Substitute time in formula. ✓ Substitueer tyd in formule. Final answer/Finale antwoord: 2 Hz ✓

(4)

(b)

POSITIVE MARKING FROM QUESTION 9.1.2(b) & 9.1.3(a). POSITIEWE NASIEN VAN VRAAG 9.1.2(b) & 9.1.3(a).	
Marking criteria/Nasienriglyne <ul style="list-style-type: none"> Formula/Formule ✓ Substitute time/frequency in formula. ✓ Substitueer tyd/frekwensie in formule. Substitute distance/wavelength in formula. ✓ Substitueer afstand/golflengte in formule. Final answer/Finale antwoord: 0,27 Hz ✓ 	
OPTION 1/OPSIE 1 $v = \frac{\Delta s}{\Delta t} \checkmark$ $= \frac{0,375}{0,75} \checkmark$ $= 0,5 \text{ m} \cdot \text{s}^{-1} \checkmark$	OPTION 2/OPSIE 2 $v = f\lambda \checkmark$ $= (2) \checkmark (0,25) \checkmark$ $= 0,5 \text{ m} \cdot \text{s}^{-1} \checkmark$

(4)

9.2

9.2.1 Reflected sound wave/Weerkaatste klankgolf ✓

(1)

9.2.2 Sound waves are created by the vibration of an object, ✓
which causes surrounding air molecules to vibrate. ✓

Klankgolwe ontstaan deur die vibrasie van 'n voorwerp,
wat omringende lugmolekule laat vibreer.

(2)

9.2.3 **For building 1/Vir gebou 1:**

$$\text{Time/Tyd} = \frac{1}{2} \times 2 \checkmark$$

$$= 1 \text{ s}$$

$$\text{Distance/Afstand} = \text{speed/spoed} \times \text{time/tyd} \checkmark$$

$$= 330(1) \checkmark$$

$$= 330 \text{ m}$$

For Building 2/Vir gebou 2:

$$\text{Time/Tyd} = \frac{1}{2} \times 3 \checkmark$$

$$= 1,5 \text{ s}$$

$$\text{Distance/Afstand} = \text{speed/spoed} \times \text{time/tyd}$$

$$= 330(1,5) \checkmark$$

$$= 495 \text{ m}$$

Distance between the two buildings/Afstand tussen twee geboue:

$$330 + 495 = 825 \text{ m} \checkmark$$

(6)
[21]

QUESTION 10/VRAAG 10

10.1 A pulse is a single disturbance in a medium. $\checkmark\checkmark$ **(2 marks or zero.)**
'n Puls is 'n enkele versteuring in 'n medium. **(2 punte of nul)**

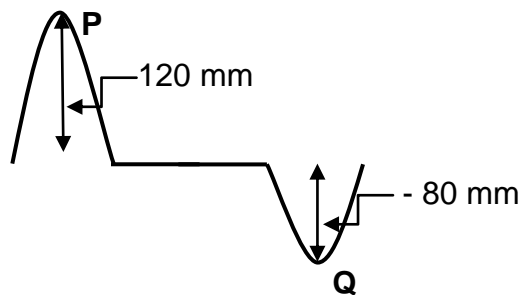
(2)

10.2 (Destructive) interference/(Destruktiewe) interferensie \checkmark

(1)

10.3

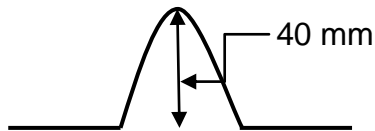
10.3.1



Marking criteria/Nasienriglyne:	
Shape and amplitude of Q as shown./Vorm en amplitude van Q soos getoon.	\checkmark
Shape and amplitude of P as shown./Vorm en amplitude van P soos getoon.	\checkmark

(2)

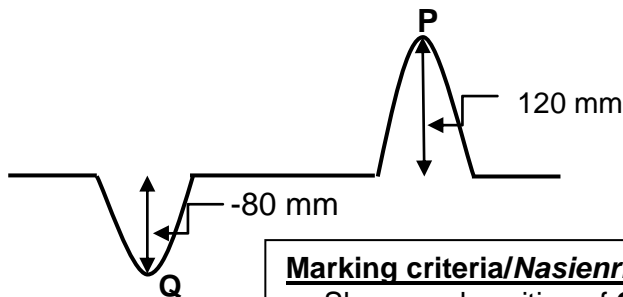
10.3.2



Marking criteria/Nasienriglyne:	
One pulse shown./Een puls getoon.	✓
Pulse on same side of equilibrium position as pulse P ./Puls aan dieselfde kant van die ewewigspisise as puls P .	✓
Amplitude = 40 mm	✓

(3)

10.4



Marking criteria/Nasienriglyne:

- Shape and position of **Q** as shown.
/Vorm en posisie van **Q** soos getoon. ✓
- Shape and position of **P** as shown.
/Vorm en posisie **P** soos getoon. ✓

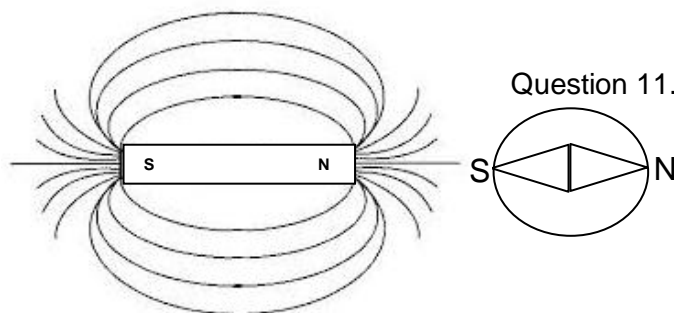
(3)
[11]

QUESTION 11/VRAAG 11

11.1 It is a region in space ✓ where another magnet will experience a force. ✓
Dit is 'n gebied in die ruimte waar *'n ander magneet 'n krag sal ondervind*.

(2)

11.2



Question 11.3/Vraag 11.3

Marking criteria/Nasienriglyne:	
Lines connecting N and S./Lyne verbind N en S.	✓
Lines closer together at poles./Lyne nader aan mekaar by pole.	✓
NOTE/L.W.: Do not penalise for direction./Moenie vir rigting penaliseer nie.	

(2)

- 11.3 Direction (N-S) of compass indicated correctly on sketch above. ✓
Rigting (N-S) van kompas korrek aangedui op bostaande skets. (1)
- 11.4 Direction of the magnetic field./*Rigting van die magneetveld.* ✓ (1)
- 11.5
- 11.5.1 North/Noord ✓
Side C will be a south pole of the magnet to the right. ✓
The ends of the two magnets facing each other should attract. ✓
Kant C sal 'n suidpool wees van die magneet na regs. ✓
Die kante van die twee magnete wat na mekaar gerig is moet mekaar aantrek. (3)
- 11.5.2 Attractive/Aantrekkend ✓ (1)
- [10]**

GRAND TOTAL/GROOTTOTAAL: 150