



education

Department of
Education
FREE STATE PROVINCE

EXAMINATION *EKSAMEN*

GRADE/GRAAD 10

PHYSICAL SCIENCES *FISIESE WETENSKAPPE*

MEMORANDUM

JUNE/JUNIE 2017

TIME/TYD: 3 HOURS/UUR

MARKS/PUNTE: 150

This memorandum consists of SEVEN pages.
Hierdie memorandum bestaan uit SEWE bladsye.

QUESTION 1 / VRAAG 1

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

[10 x 2 = 20]

QUESTION 2 / VRAAG 2

2.1.1	Cereal in milk ✓ Garden soil ✓	Ontbytgraan in melk ✓ Tuingrond ✓	(2)
2.1.2	Liquid coffee ... ✓ Salt water ✓	Vloeibare koffie ... ✓ Soutwater ✓	(2)
2.2.1	Sodium hydrogen carbonate ✓ Table salt crystals ✓	Natriumwaterstofkarbonaat ✓ Tafelsoutkristalle ✓	(2)
2.2.2	Paper-clips ... ✓ Graphite in a pencil ✓	Skuifspelde ✓ Grafiet in 'n potlood ✓	(2)
2.3	It is a <u>pure substance</u> ✓ that consists of <u>one type of atom (element)</u> . ✓	Dit is 'n <u>suiwer stof</u> ✓ wat net uit <u>een soort atoom (element) bestaan</u> . ✓	(2)
2.4.1	Magnetic separation ✓	Magnetiese skeiding ✓	(1)
2.4.2	Evaporation ✓	Verdamping ✓	(1)
2.4.3	Filtration ✓	Filtrering ✓	(1)
2.4.4	Distillation ✓	Distillering ✓	(1)
[14]			

QUESTION 3 / VRAAG 3

3.1	0 ✓ (°C) / Zero		(1)
3.2	Lower than ✓	Laer as ✓	(1)
3.3	Evaporation: The <u>change of a liquid into a vapour</u> ✓ at <u>any temperature below the boiling point</u> . ✓ Boiling point: The <u>temperature of a liquid</u> ✓ at which <u>its vapour pressure equals the external (atmospheric) pressure</u> . ✓ Verdamping: Die <u>verandering van 'n vloeistof na 'n damp</u> ✓ by <u>enige temperatuur onder die kookpunt</u> . ✓ Kookpunt: Die <u>temperatuur van 'n vloeistof</u> ✓ waar <u>sy dampdruk gelyk is aan die eksterne (atmosferiese) druk</u> . ✓		
3.4	Melting ✓	Smelting ✓	(1)
3.5	X: Liquid / Vloeistof ✓ H ₂ O: Solid / Vastestof ✓		(2)
3.6	Solid / Vaste stof ✓		(1)
3.7	(X) more than (H ₂ O) ✓ [Or similar]	(X) meer as (H ₂ O) ✓ [Of soortgelyk]	(1)
[11]			

QUESTION 4 / VRAAG 4

4.1 19 ✓ (1)

4.2 K^+ ✓ (1)

4.3 12 ✓ (1)

4.4 Nitrogen / Stikstof ✓ (1)

4.5 4 / IV / 14 ✓ (1)

4.6 Halogens / Halogene ✓ (1)

4.7 Argon ✓



Atomic radius decreases from left to right ✓ in a period ✓ OR increases from right to left in a period.

Atoomradius neem af van links na regs ✓ in 'n periode ✓ OF neem toe van regs na links in 'n periode. (3)

4.8 Energy needed ✓ (per mole) to remove the first electron ✓ from an atom in the gaseous phase. ✓ Energie benodig ✓ (per mol) om die eerste elektron te verwyder ✓ uit 'n atoom in die gasfase. ✓ (3)

4.9.1 2 ✓ (1)

4.9.2 $Mg \rightarrow Mg^{2+} + 2e^-$ (✓✓) (2)

4.10.1 Silicon / Silikon ✓ (1)

4.10.2 $1s^2 2s^2 2p^6 \checkmark 3s^2 3p^4 \checkmark$ (2)

4.11.1 2p 2s 1s Levels correctly labelled. ✓ Ten electrons ✓ Two per orbital; opposite spin ✓ Vlakke korrek gemerk. ✓ Tien elektrone ✓ Twee per orbitaal; teenoorgestelde spin. ✓ (3)

4.11.2 $^{20}_{10}\text{Ne}$. Correct atomic number (10), in correct position with correct symbol ✓ Correct mass number (20) and in correct position ✓ Korrekte atoomgetal (10), in korrekte posisie en met korrekte simbool ✓ Korrekte massagetal (20) en in korrekte posisie ✓ (2)

4.12.1 Atoms of the same element ✓ having the same number of protons, but different numbers of neutrons. ✓ Atome van dieselfde element ✓ wat dieselfde aantal protone het, maar verskillende hoeveelhede neutrone het. ✓ (2)

4.12.2

$$35,5 = \frac{(75,8)(35) + (24,2)x}{100}$$

$$x = 37$$

Correct symbols such as Mr, etc. are not expected.
Korrekte simbole soos Mr, ens. word nie verwag nie.

(4)

4.12.3 20 (✓✓)

-17

(2)
[31]

QUESTION 5 / VRAAG 5

5.1 A group of two or more atoms ✓
that are covalently bonded and that
functions as a unit. ✓

'n Groep van twee of meer atome ✓
wat kovalent gebind is en as 'n eenheid
funksioneer. ✓

(2)

5.2 A pure substance consisting ✓
of two or more different elements. ✓

'n Suiwer stof bestaande ✓
uit twee of meer verskillende elemente. ✓


(2)

5.3 1 ✓

(1)

5.4 2 ✓


(1)


5.5.1  (✓✓)

(2)

5.5.2  (✓✓)

(2)

5.6 Covalent (bonds) ✓
 Sharing of electrons ✓

Kovalente (bindings) ✓
 Elektrondeling ✓

(2)
[12]

QUESTION 6 / VRAAG 6

6.1.1 Ionic (bonds) ✓



Transfer of electrons ✓

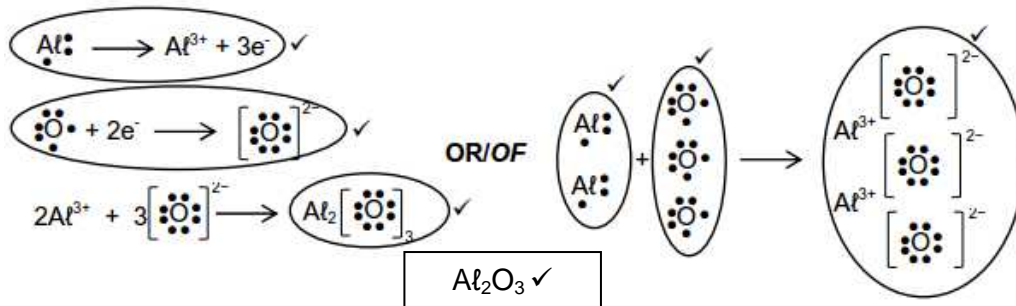
Ioniese (bindings) ✓



Elektronoordrag ✓

(2)

6.1.2



(4)

6.2.1 CaCl_2 ✓

(2)

6.2.2 $(\text{NH}_4)_2\text{SO}_4$ ✓

(2)

6.2.3 $\text{Be}(\text{NO}_3)_2$ ✓

(2)

6.3 $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$ ✓

(2)

6.4 $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{X}$

$M_r(2\text{NaOH}) = 2(23+16+1) = 80$ ✓
 $M_r(\text{H}_2\text{SO}_4) = 2(1)+32+4(16) = 98$ ✓
 $M_r(\text{Na}_2\text{SO}_4) = 2(23)+32+4(16) = 142$ ✓
 $M_r(\text{X}) = 80 + 98 - 142 = 36$ ✓

(5)
[19]

QUESTION 7 / VRAAG 7

7.1.1 A single disturbance ✓ in a medium. ✓

'n Enkele versteuring ✓ in 'n medium. ✓

(2)

7.1.2 Destructive interference ✓
OR Superposition

Destruktiwe interferensie ✓
OF Superposisie

(1)

7.1.3

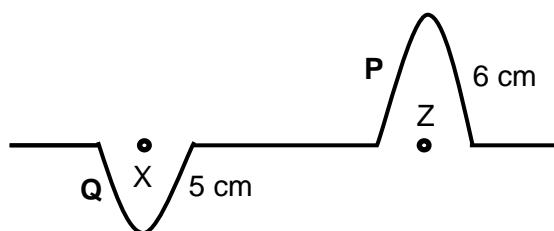


Single disturbance ✓
 Above middle line ✓
 Magnitude 1 cm ✓

Enkele versteuring ✓
 Bokant middellyn ✓
 Grootte 1 cm ✓

(3)

7.1.4



Q to left of P ✓
 Amplitudes correct ✓
 Orientation correct ✓

Q links van P ✓
 Amplitudes korrek ✓
 Oriëntasie korrek ✓

(3)

7.2.1 Longitudinal (wave) ✓



The particles of the medium vibrate parallel ✓
to the direction of motion of the wave. ✓

Longitudinale (golf) ✓



Die deeltjies van die medium vibreer parallel ✓ aan
die bewegingsrigting van die golf. ✓

(3)

7.2.2

$$\begin{aligned} v &= \lambda f \quad \checkmark \\ 0,2 \quad \checkmark &= 0,1f \quad \checkmark \\ f &= 2 \text{ Hz} \quad \checkmark \end{aligned}$$

(4)

7.3

$$\begin{aligned} v &= \lambda f \\ &= (0,085)(18\,000) \quad \checkmark \\ &= 1\,530 \text{ m} \cdot \text{s}^{-1} \end{aligned}$$

Speed/Spoed = $\frac{\text{Distance/Afstand}}{\text{Time/Tyd}} \quad \checkmark$

$1530 = \frac{\text{Distance/Afstand}}{1,2} \quad \checkmark$

Depth/Diepte = 1836 m ✓

OR / OF

Speed/Spoed = $\frac{\text{Distance/Afstand}}{\text{Time/Tyd}} \quad \checkmark$

$1530 = \frac{\text{Distance/Afstand}}{2,4} \quad \checkmark$

Depth/Diepte = $\frac{1}{2} \times 3673$

= 1836 m ✓

(4)

[20]

QUESTION 8 / VRAAG 8

8.1.1 **One of:** Keeping food warm; remote controls; in optical fibres; snakes while hunting; infrared scanners; night vision apparatus; heat sensors; laser metal cutting

Een van: Hou kos warm; afstandbeheerders, in optiese vesels, slange wanneer hulle jag; infrarooi skandeerders; nagsigapparaat; hittesensors; lasermetaalsny

(1)

8.1.2 Gamma; ultraviolet; infra red/infrarooi (✓✓)

(2)

8.1.3

$$\begin{aligned} E &= \frac{hc}{\lambda} \quad \checkmark \\ &= \frac{(6,63 \times 10^{-34})(3 \times 10^8)}{1 \times 10^{-7}} \quad \checkmark \\ &= 1,99 \times 10^{-18} \text{ J} \quad \checkmark \end{aligned}$$

OR / OF

$$\begin{aligned} c &= \lambda f \\ 3 \times 10^8 &= (1 \times 10^{-7})f \quad \checkmark \\ f &= 3 \times 10^{15} \text{ Hz} \quad \checkmark \\ E &= hf \\ &= (6,63 \times 10^{-34})(3 \times 10^{15}) \quad \checkmark \\ &= 1,99 \times 10^{-18} \text{ J} \quad \checkmark \end{aligned}$$

(4)

8.1.4 Micro waves ✓

Mikrogolwe ✓

(1)

8.2.1 X-rays ✓

X-strale ✓

(1)

8.2.2 Penetrate soft tissue ✓
Does not penetrate bone. ✓

Dring sagte weefsel binne. ✓
Dring nie been binne nie. ✓

(2)


8.2.3 Damage cells. / Cancer ✓

Beskadig selle. / Kanker ✓

(1)

[12]

QUESTION 9 / VRAAG 9

- 9.1 A region in space ✓ where a magnet or ferromagnetic material experience a force (non-contact). ✓
'n Gebied in die ruimte ✓ *waar 'n magneet of ferromagnetiese materiaal 'n krag ondervind* (nie-kontak). ✓ (2)
- 9.2 Ferromagnetic (material) ✓ Ferromagnetiese (materiaal) ✓ (1)
- 9.3.1 Same polarity ✓ Dieselfde polariteit ✓
OR Both south poles OF Beide suidpole (1)
- 9.3.2 No ✓ Nee ✓ (1)
- 9.3.3 D to C ✓ D na C ✓
 D is north. ✓ D is noord. ✓
OR C is south. OF C is suid. (2)
- 9.4.1 Point in the northern hemisphere where the rotation axis of the earth meets the surface. ✓
Punt in die noordelike halfrond waar die rotasie-as van die aarde die oppervlak ontmoet. ✓ (1)
- 9.4.2 The point where the magnetic field lines of the earth enters the earth.
Die punt waar die magneetveldlyne van die aarde die aarde binnegaan.
OR / OF ✓
The direction in which the north pole of a compass points.
Die rigting waarin die noordpool van 'n kompas wys. (1)
- 9.4.3 T (✓✓) (2)

[11]

GRAND TOTAL/GROOTTOTAAL: 150