



education

Department of
Education
FREE STATE PROVINCE

**PROVINCIAL CONTROL TEST
*PROVINSIALE KONTROLETOETS***

GRADE/GRAAD 10

**PHYSICAL SCIENCES
*FISIESE WETENSKAPPE***

MEMORANDUM

MARCH/MAART 2017

TIME/TYD: 2 HOURS/URE

MARKS/PUNTE: 100

This memorandum consists of SIX pages.
Hierdie memorandum bestaan uit SES bladsye.

QUESTION 1/VRAAG 1

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

QUESTION 2/VRAAG 2

- 2.1
- 2.1.1 Homogeneous / *Homogeen* ✓
All components are in the same phase. / Alle komponente is in dieselfde fase. ✓ (2)
- 2.1.2 A substance that cannot be separated by physical methods. ✓✓
'n Stof wat nie deur fisiese metodes geskei kan word nie. (2)
- 2.1.3 Pure substance / *Suiwer stof* ✓ (1)
- 2.1.4 Element ✓
It is a pure substance consisting of one type of atom only. ✓
Dit is 'n suiwer stof wat slegs uit een soort atoom bestaan. (2)
- 2.2
- 2.2.1 Remove the marbles by hand. / *Verwyder die albasters met die hand.* ✓
Remove the iron filings with a magnet. / *Verwyder die ystervylsels met 'n magneet.* ✓
Add water to the mixture of sand and sugar. / Voeg water by die mengsel van sand en suiker. ✓
Remove the sand by filtration after the sugar has dissolved. / Verwyder die sand deur filtrasie nadat die suiker opgelos het. ✓ (4)
- 2.2.2 (a) Magnetic / *Magneties* ✓ (1)
- (b) Soluble in water / *Oplosbaar in water* ✓ (1)
- [13]**

QUESTION 3/VRAAG 3

3.1

3.1.1 V / 5 / 15 ✓

Five electrons in highest filled energy level./Five valence electrons. ✓
Vyf elektrone in hoogste gevulde energievlak./Vyf valenselektrone.

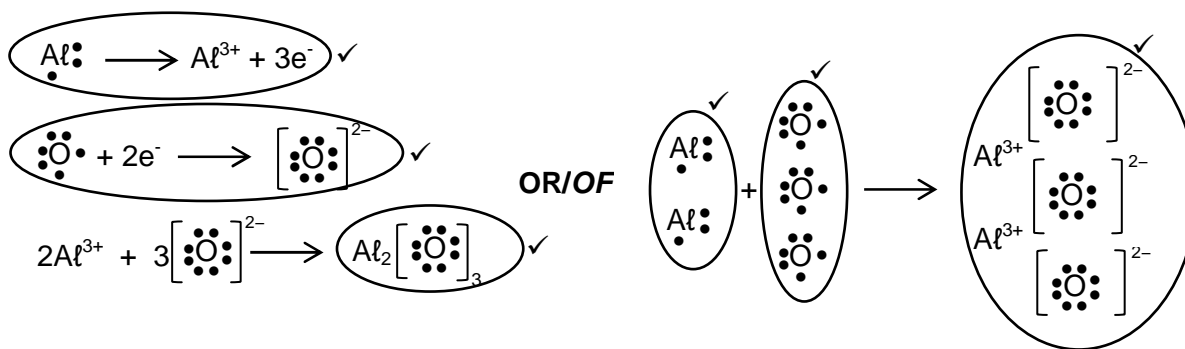
(2)

3.1.2 3 ✓

Electrons distributed over three main energy levels. ✓
Elektrone versprei oor drie hoofenergievlakke.

(2)

3.2



(3)

3.3

3.3.1 2 ✓

(1)

3.3.2 2 ✓

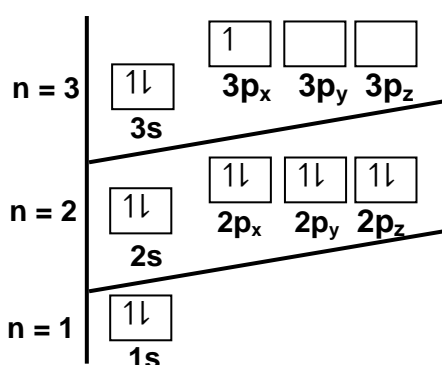
(1)

3.3.3 $\text{Q} \rightarrow \text{Q}^{2+} + 2\text{e}^-$ ✓✓

(2)

3.4

3.4.1



Marking criteria for diagram/Nasienriglyne vir diagram:	
Three main energy levels shown. <i>Drie hoofenergievlakke aangedui.</i>	✓
Orbitals labelled as s or p. <i>Orbitale genommer as s of p.</i>	✓
Six electron pairs shown as arrows in opposite directions in blocks or circles. / Ses elektronpare getoon as pyltjies in teenoorgestelde rigtings in blokke of sirkels.	✓
One single electron in a 3p orbital. <i>Een alleenelektron in 3p-orbitaal</i>	✓

(4)

3.4.2 Aluminium ✓

(1)

[16]

QUESTION 4/VRAAG 4

4.1

4.1.1 ANY TWO/ENIGE TWEE:

Different number of protons. / *Verskillende getal protone.* ✓

Different number of neutrons. / *Verskillende getal neutrone.* ✓ (2)

4.1.2 Same number of neutrons. / *Dieselfde getal neutrone.* OR/OF

Same number of electrons / *Dieselfde getal elektrone.* ✓ (1)

4.1.3 Chlorine / *Chloor* ✓

(1)

4.1.4 18 ✓

(1)

4.1.5 Same number of electrons. / *Dieselfde getal elektrone.* ✓

(1)

4.1.6 Z ✓

(1)

4.1.7 Ca ✓

(1)

4.2

4.2.1 Ionic (bonding) / *Ioniese (binding)* ✓

(1)

4.2.2 Metallic (bonding) / *Metaal(binding)* ✓

(1)

4.2.3 Covalent (bonding) / *Kovalente (binding)* ✓

(1)

4.3

4.3.1 Br₂ ✓

(1)

4.3.2 (NH₄)₃PO₄ ✓

(2)

4.3.2 Mg(NO₃)₂ ✓

(2)

4.4

4.4.1 Sodium hydrogen sulphite / *Natriumwaterstofsulfiet* ✓

(1)

4.4.2 Zinc sulphide / *Sinksulfied* ✓

(1)

4.5 1 : 2 ✓

(1)

[19]

QUESTION 5/VRAAG 5

5.1 Atoms of the same element with the same atomic number ✓ but different mass numbers. ✓

Atome van dieselfde element met dieselfde atoomgetal maar verskillende massagetalle.

(2)

5.2 Rel. atomic mass/Rel. atoommassa = $\left(\frac{20}{100}\right)10 + \left(\frac{80}{100}\right)11$ ✓
= 10,8 ✓

(3)

5.3 Protons / *Protone* ✓

Electrons / *Elektrone* ✓ (2)

5.4 Neutrons / *Neutrone* ✓ (1)
[8]

QUESTION 6/VRAAG 6

6.1 The disturbance is at right angles (or perpendicular to) the direction of motion of the wave. ✓✓
Die versteuring is reghoekig tot (of loodreg op) die rigting van beweging van die golf. (2)

6.2

6.2.1 A & H ✓
OR/OF
ANY COMBINATION OF/ENIGE KOMBINASIE VAN:
B, D, F **OR/OF** C, E, G (1)

6.2.2 ANY ONE/ENIGE EEN:
A & B; ✓ A & C; A & D; A & E; A & F; A & G

OR/OF
Any combination of a crest and a trough/*Enige kombinasie van 'n kruin en 'n buik.* (1)

6.3 Upwards / *Opwaarts* ✓ (1)

6.4 The distance between two consecutive points in phase. ✓✓
Die afstand tussen twee opeenvolgende in fase punte. (2)

6.5

6.5.1 2,25 wavelengths/*golflengtes* = 10 m
 $\lambda = \frac{10}{2,25} = 4,44 \text{ m}$ ✓ (1)

6.5.2 $\frac{2,5}{2} = 1,25 \text{ m}$ ✓ (1)

6.5.3 6 waves/*golwe* in 4 s
1 wave/*golf* in $\frac{4}{6}$ ✓ = 0,67 s ✓ (2)

6.5.4 $f = \frac{1}{T}$
 $= \frac{1}{0,67}$ ✓
 $= 1,49 \text{ Hz}$ ✓ (1,5 Hz)

OR/OF
6 waves/*golwe* in 4 s }
x waves/*golwe* in 1 s } ✓
x = 1,5 Hz ✓ (2)

6.5.5 **POSITIVE MARKING FROM QUESTION 6.5.1, 6.5.3 & 6.5.4.**
POSITIEWE NASIEN VAN VRAAG 6.5.1, 6.5.3 & 6.5.4.

$v = f\lambda$ ✓ OR $\Delta x = v\Delta t$ ✓
 $= 1,5 \times 4,44$ ✓ $4,44 = v(0,67)$ ✓
 $= 6,66 \text{ m} \cdot \text{s}^{-1}$ ✓ $v = 6,63 \text{ m} \cdot \text{s}^{-1}$ ✓ (3)

[16]

QUESTION 7/VRAAG 7

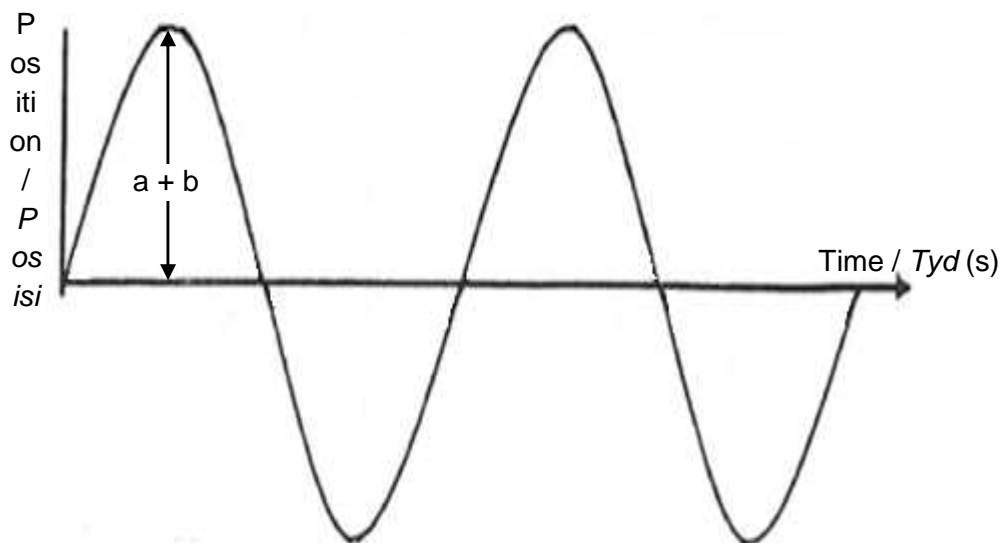
- 7.1 When two waves meet at a point, the resultant amplitude (at that point) ✓ is the algebraic sum of the amplitudes of the two waves at the point. ✓
 Wanneer twee golwe by 'n punt ontmoet, is die resulterende amplitude (by daardie punt) gelyk aan die algebraïese som van die amplitudes van die twee golwe by daardie punt. (2)

7.2

- 7.2.1 Equal to / Gelyk aan ✓ (1)

- 7.2.2 Smaller than / Kleiner as ✓ (1)

7.3



Marking criteria for diagram/Nasienriglyne vir diagram:	
Correct amplitude./Korrekte amplitude: (a+b)	✓✓
Correct shape for two wavelengths shown. Korrekte vorm vir twee golflengtes getoon	✓

(3)

- 7.4 Constructive interference / Konstruktiewe interferensie ✓ (1)

[8]

GRAND TOTAL/GROOTTOTAAL: 100