Education and Sports Development

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GRAAD 10/ *GRADE 10*

FISIESE WETENSKAPPE/*PHYSICAL SCIENCES*

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MEMORANDUM

PUNTE/*MARKS* : 150

Hierdie memorandum bestaan uit 8 bladsye**.** / *This memorandum consists of 8 pages*

VRAAG 1/*QUESTION 1*:

1.1. A ✓✓ (2)

1.2. C ✓✓ (2)

1.3. B ✓✓ (2)

1.4. A ✓✓ (2)

1.5. C ✓✓ (2)

1.6. D ✓✓ (2)

1.7. B ✓✓ (2)

1.8. C ✓✓ (2)

1.9. B ✓✓ (2)

1.10. C ✓✓ (2)

[20]

VRAAG 2/*QUESTION 2*:

2.1. 'n Element bestaan net uit een soort atoom ✓terwyl 'n verbinding uit meer as een soort element/atoom, wat chemies gebind is, bestaan ✓/
An element consists of only one kind of atom ✓ while a compound consists of more than one element/atom that is chemically bonded✓ (2)

2.2.1. heterogene mengsel ✓ / *heterogeneous mixture*✓ (1)

2.2.2. verbinding✓ / *compound* ✓ (1)

2.2.3. element ✓ (1)

2.2.4. homogene mengsel✓ homogenous mixture ✓ (1)

2.3. Heterogene mengsel is 'n mengsel wat nie deurgaans uniform/dieselfde is nie en waarvan die komponente van mekaar onderskei kan word ✓✓/
A heterogeneous mixture is a mixture that is not uniform and of which different components can be distinguished✓ ✓ (2)

2.4.1. metale is goeie geleiers van elektrisiteit. ✓/*metals are good conductors of electricity*✓ (1)

2.4.2. metale is sterk ✓/*metals are strong*✓ (1)

2.4.3. metale is pletbaar/ rekbaar ✓/*metals are malleable or ductile* ✓ (1)

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VRAAG 3/*QUESTION 3*:

3.1.1. LiBr✓ (1)

3.1.2. $Mg(OH)_2$✓ (1)

3.1.3. $Fe_2(CO_3)_3$✓ (1)

3.2.1. Natriumnitriet✓/*Sodium nitrite* ✓ (1)

3.2.2. Swaweltrioksied✓/*sulphur trioxide*✓ (1)

3.2.3. Koper(I)sulfaat✓/*Copper (I)sulphate* ✓ (1)
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VRAAG 4/*QUESTION 4*:

4.1. vaste stof✓/*solid*✓ (1)

4.2. −101ºC ✓ (1)

4.3. kondensasie✓ /*condensation*✓ (1)

4.4. vriesing✓/*freezing*✓ (1)

4.5. die energie word vrygestel soos die kragte tussen die molekules/intermolekulêre kragte ontstaan/versterk, / n faseverandering vind plaas. ✓✓ /
Energy is released as the forces between the molecules (inter molecular forces) strengthens/ phase change takes place✓✓ (2)

4.6.1. spasies neem effens/bietjie af / spasies verklein effens. ✓/ *spaces decrease a bit* ✓ (1)

4.6.2. deeltjies beweeg stadiger, / deeltjies gly nie meer oormekaar nie maar vibreer in vaste posisie. ✓/
Particles move slower/ they do not glide over each other, but vibrate in fixed positions✓ (1)

4.6.3. kragte neem toe / versterk✓/*forces increase or become stronger* ✓ (1)

4.7. Kookpunt: die temperatuur waar die dampdruk van die vloeistof gelyk is aan die atmosferiese druk✓✓ /
Boiling point is the temperature where the vapour pressure of the liquid is equal to atmospheric pressure ✓✓ (2)

4.8. Fisiese verandering, ✓
die stof bly nog dieselfde stof/ het sy identiteit behou/ geen nuwe stowwe is gevorm nie, dit ondergaan net 'n fase verandering/ molekules het geherrangskik nie die atome nie ✓/
Physical change✓
The substance remains the same / no new substances has formed. The only change is the phase that has changed. Rearrangement has taken place ✓ (2)

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VRAAG 5/*QUESTION 5*:

5.1.1. 80 ✓ (1)

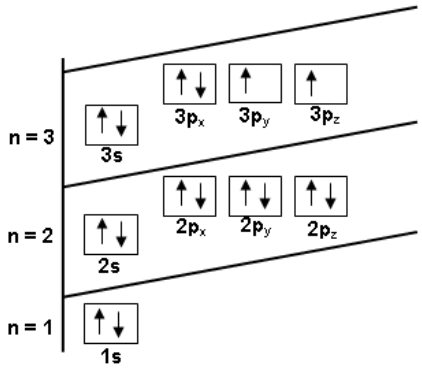
5.1.2. 80✓ (1)

5.1.3. 121✓ (1)

5.1.4. 18✓ (1)

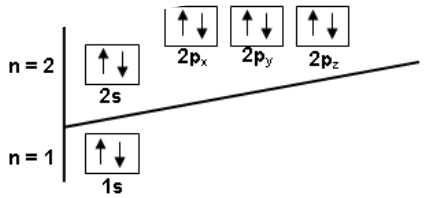
5.1.5. 10✓ (1)

5.2.1. S



✓✓ (2)

5.2.2. Mg^{2+}



✓✓ (*die 3s orbital kan ook aangedui word, maar hy moet leeg wees)*
(*the 3s orbit may be indicated, but it must be empty)* (2)

5.3.1. A = Al/ aluminium✓
B^- = F / Fluoried ioon / F^- ✓/*Floride ion* (2)

5.3.2. 3 ✓ (1)

5.3.3. 1/ −1✓ (1)

5.4.1. Isotope is atome van dieselfde element wat verskillende aantal neutrone bevat / of
Isotope is atome met dieselfde aantal protone, maar verskillende aantal neutrone. ✓✓
Isotopes are atoms of the same element that have different amount of neutrons / or
Isotopes ore atoms of the same element that have the same amount of protons but different amount of neutrons (2)

5.4.2 Li–6 = 100 – 92,5% = 7,5 %✓
Relatiewe atoommassa = $\frac{(92,5\times7) + (7,5\times6)}{100}$ ✓ = *Relative atomic mass*
Relatiewe atoommassa = 6,925/ 6,93 ✓ = Relative atomic mass (3)

5.5. Kalsium het net 2 valenselektrone, ✓ dit sal dus min energie vat om die eerste twee elektron te verwyder, ✓maar om die derde elektron te verwyder moet ‘n binne/kern elektron verwyder word, wat vreeslik baie energies al vat/wat kalsium onstabiel sal maak. ✓
Calcium has 2 valence electrons. ✓ It will need a small amount of energy to release the first two electrons. ✓ but the third electron has to be released from an inside energy level/ is a core electron and a lot of energy would be required to do that. ✓ (3)

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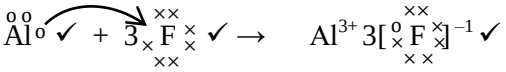
VRAAG 6/ *QUESTIONS 6*:

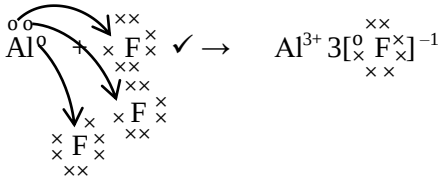
6.1.1 ioniese binding ✓ *ionic bond* (1)

6.1.2. kovalente binding✓ *covalent bond* (1)

6.1.3. metaalbinding ✓ *metal bond* (1)

6.1.4. kovalente binding ✓ *covalent bond* (1)

6.2. 

of  (3)

[7]

VRAAG 7/*QUESTION 7*:

7.1 Chemiese verandering, ✓
'n nuwe stof is gevorm/ atome is geherrangskik ✓
Chemical change ✓
A new substance is formed/ Atoms are rearranged✓ (2)

7.2. 4 Li + O_2 ✓ → 2 Li_2O ✓ ✓ balansering /*balancing* (3)

7.3 4 (7) + 2(16) ✓ → 2(2)(7) + 2(16) ✓
60 (g/g·mol^{-1}) → 60 (g/g·mol^{-1}) ✓ *(positiewe nasien vanaf 7.2. eenheide nie belangrik)* (3)
(*positive marking from 7.2. units not important)* **[8]**

VRAAG 8/*QUESTION 8*:

8.1. Frekwensie is die aantal golwe wat verby 'n punt beweeg in 1 sekonde. ✓✓
Frequency is the number of waves pulses per second ✓✓ (2)

8.2. Amplitude = 90 cm ÷ 2 ✓ = 45 cm = 0,45 m ✓ (2)

8.3. λ = 2,4 m ÷ 3 ✓ = 0,8 m ✓ (2)

8.4. Opwaarts ✓/ *Upward* ✓ (1)

8.5. Twee punte is in fase wanneer hulle dieselfde beweging terselfdertyd uitvoer. ✓
/ Twee punte is in fase wanneer hulle in dieselfde rigting op dieselfde tyd teen dieselfde spoed beweeg.
Two points are in phase when they make the same movement at the same time/ Two points are in phase when they move in the same direction at the same time with the same speed/ *Two points in phase are separated by a whole number multiple of complete wavelengths* ✓ (1)

8.6. Periode = 0,15 s ÷ 3 ✓ = 0,05 s =*Period*

$T = \frac{1}{f}$ ✓

$0,05 = \frac{1}{}$ ✓

f

f = 20 Hz ✓ (4)

8.7. v = λf ✓ ***OF*** v = λ/T

v = 0,8 × 20 Hz ✓ v = 0,8/0,05

v = 16 m.s^{-1} ✓ v = 16 m.s^{-1} (3)

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VRAAG9/ *QUESTION* 9:

9.1. Dit is klanke bo die menslike omvang van gehoor/ klanke bo 20 000 Hz/ 20 kHz✓
It is sounds outside human range of hearing/above 20 000 Hz/ 20kHz ✓ (1)

9.2. longitudinaal✓ /*longutudinal* (1)

9.3. tyd = 0,02 ÷ 2 = 0,01 s ✓= *time* ***OF*** spoed = $\frac{\text{afstand}}{\text{tyd}}$ speed=distance/time

spoed = $\frac{\text{afstand}}{\text{tyd}}$ ✓ =*speed* =*distance/time* afstand = 338 × 0,02 = *distance*

afstand = 6,76 =*distance*

afstand = 338 × 0,01 ✓= distance afstand = 6,76 ÷ 2 = 3,38 m

afstand = 3,38 m ✓ =distance (4)

9.4. • gesondheid van ongebore babas te kyk/ gewasse en galstene op te spoor
• juwele skoon te maak
• haarlyn krake en foute te vind in metaal voorwerpe in die insdustrie
• duikbote gebruik sonar om onder water beweeg sonder om in voorwerpe vas te ry
• visserbote kan visse opspoor. ✓ *enige 1*

-check the health of unborn babies/ to locate gall stones or growths
-to clean jewellery
-to find hair line cracks in metal objects in the industry
-submarines use sonar to move under water without bumping into things
-fishing boats locate fish any1 *(1)*

[7]

VRAAG 10/*QUESTION 10*:

10.1. kleinste✓ *smallest* (1)

10.2. c = $f\lambda$ / v = $f\lambda$ ✓

$3 \times 10^8 = (94{,}4 \times 10^6)\lambda$ ✓

λ = 3,18 m ✓ (3)

10.3. E = h f ✓ OF E = $\frac{hc}{\lambda}$ *(positiewe nasien vanaf 10.2)*

E = $(6{,}63 \times 10^{-34})(94{,}4 \times 10^6)$ ✓

E = $6{,}25872 \times 10^{-26}$ J ✓ E = $\frac{(6{,}63 \times 10^{-34})(3 \times 10^8)}{(3{,}18)}$

(positive marking from 10.2) E = $6{,}25872 \times 10^{-26}$ J (3)

10.4. • Radiogolwe beweeg teen die spoed van lig/ 3×10^8 $m.s^{-1}$, teenoor klankgolwe wat teen 343 $m.s^{-1}$, beweeg/of radiogolwe beweeg teen 'n baie hoë spoed en klankgolwe teen 'n lae spoed, ✓
• jy hoor dus dadelik wat die radiostasie uitstuur deur radiogolwe, met klankgolwe gaan jy baie later eers dit hoor hoe verder jy is. ✓
• radiogolwe kan lang afstande trek en jou bereik, klankgolwe trek net 'n kort afstand en sal jou nooit bereik as jy nie by die radiostasie is nie. ✓ (enige gepaste antwoord) (3)
-Radio waves move at speed of light 3×10^8 $m.s^{-1}$, *while sound waves move at* 343 $m.s^{-1}$, */ radio waves moves at a high speed and sound waves move at al low speed*
-you hear radio waves immediately but with sound waves you would only hear it after a while
-radio waves can travel over long distances but sound waves can only travel over short distances and will never reach you if you are not close to the radio station ✓✓✓ *(any suitable answer)*

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VRAAG 11/*QUESTION 11*:

11.1. Gelyksoortig, ✓ /*Equal to*
hulle stoot mekaar af✓/ *repell* (2)

11.2. Aantrek✓ / *attract* (1)

11.3. na D ✓ *to D* (1)

11.4. Geografiese Noordpool: dis die punt in die noordelike halfrond waar die as, waarom die aarde draai, die oppervlakte ontmoet. ✓
Magnetiese Noordpool: dis die punt waar die magneetveldlyne, van die Aarde se magneetveld, die aarde binnegaan. ✓
Geographical North: is the point in the northern hemisphere where the rotation axis of the earth, meets the surface✓
Magnetic North: is the point where the magnetic field lines of the Earth's enters the earth✓ (2)

11.5. Die Aarde se magneetveld/magnetosfeer, deflekteer die grootste gedeelte van die gelaaide deeltjies in die sonwind sodat dit ons nie bereik en lewe op Aarde vernietig nie. ✓✓
(soortgelyke gepaste antwoord)
The Earths magnetic field/magnetosphere, deflect/traps the the radioactive or charged particles of the solar wind so that it does not reach the earth and destroy all live on earth✓✓
(any comparable answer) (2)

[8]

VRAAG 12/*QUESTION 12*:

12.1. $n = \frac{Q}{q_{e^-}}$ ✓

$n = \frac{-12 \times 10^{-6}}{-1,6 \times 10^{-19}}$ ✓

$n = 7,5 \times 10^{13}$ elektrone ✓/*electrons* (3)

12.2. Die netto lading van 'n geïsoleerde sisteem/stelsel bly konstant gedurende enige fisiese proses✓✓
The nett charge of an isolated system stays constant during any physical process ✓✓ (2)

12.3. $Q = \frac{Q_2 + Q_3}{2}$ ✓

$Q = \frac{-12 \times 10^{-6} + 6 \times 10^{-6}}{2}$ ✓

$Q = -3 \times 10^{-6}$ C ✓ (3)

12.4. afstoot ✓/*repell* (1)

12.5. van Q_1 na Q_2 ✓ / *from Q_1 to Q_2* (1)

[10]

VRAAG 13/*QUESTION 13*:

13.1. $\frac{1}{R_p} = \frac{1}{r_2} + \frac{1}{r_3}$ ✓

$\frac{1}{R_p} = \frac{1}{6} + \frac{1}{12}$ ✓

$\frac{1}{R_p} = \frac{3}{12}$

$R_p = 4\ \Omega$ ✓

$R_T = 4 + 8$ ✓

$R_T = 12\ \Omega$ ✓ (5)

13.2. $V = IR$ ✓ *(positiewe nasien vanaf 13.1)*

$V = (0,5)(12)$✓ *(positive marking from 13.1)*

$V = 6$ V✓ (3)

13.3. $Q = I \times \Delta t$ ✓ $\Delta t = 5 \times 60 = 300$ s

$Q = 0,5 \times 300$ ✓

$Q = 150$ C ✓ (3)

13.4 Neem af✓/*decrease* (1)

13.5. • die <u>weerstand neem toe</u> *wanneerdie* resistor verwyder word, ✓

• stroom is omgekeerd eweredig aan weerstand, so stroom neem af/ dis moeiliker vir die stroom om te beweeg, dus neem stroom af / ✓

-the <u>resistance increase</u> when the resistor is removed✓

- current is inversely proportional to resistance / it is more difficult for the current to flow, thus the current decrease/ (2)

[14]

GROOT TOTAAL/GRAND TOTAL: 150