Education and Sports Development

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GRADE 10/ *GRAAD 10*

PHYSICAL SCIENCES / *FISIESE WETENSKAPPE*

JUNE/ *JUNIE* 2019

MEMORANDUM

MARKS/ *PUNTE:* **150**

This memorandum consists of 9 pages. /Hierdie memorandum bestaan uit 9 bladsye.

QUESTION 1 / *VRAAG 1*:

1.1. D ✓✓ (2)

1.2. B ✓✓ (2)

1.3. C ✓✓ (2)

1.4. D ✓✓ (2)

1.5. B ✓✓ (2)

1.6. C ✓✓ (2)

1.7. C ✓✓ (2)

1.8. A ✓✓ (2)

1.9. A ✓✓ (2)

1.10. B ✓✓ (2)

[20]

QUESTION 2 / *VRAAG 2*:

2.1. Isotopes are atoms of the same element that have the same amount of protons but different amount of neutrons or Isotopes are atoms of the same element that have the same atomic number but different mass numbers ✓✓
Isotope is atome van dieselfde element wat dieselfde aantal protone bevat maar verskillende aantal neutrone bevat of Isotope is atome van dieselfde element wat dieselfde atoomgetal het, maar verskillende massagetalle ✓✓ (2)

2.2. 5 ✓ (1)

2.3. 6 ✓ (1)

2.4. B-10 = x & B-11 = 100 – x ✓ (both for mark / *altwee vir punt*)

$$10{,}801 = \frac{(x \times 10) + (100 - x)(11)}{100} \checkmark$$

$$1080{,}1 = 10x + 1100 - 11x$$

x = 19,9 % y = 100 – 19,9 = 80,1 %

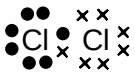
B-10 = 19,9 % ✓ B-11 = 80,1 %✓ (4)

[8]

QUESTION 3 / *VRAAG 3*:

3.1. chemical change / *chemiese verandering* ✓ (1)

3.2. New substances where formed / atoms where rearranged
nuwe stowwe het gevorm / atome is geherrangskik ✓ (1)

3.3.  ✓✓ (2)

3.4. halogens / *halogene* ✓ (1)

3.5. Cl_2 ✓ + 2Na ✓ → 2NaCl ✓ (3)

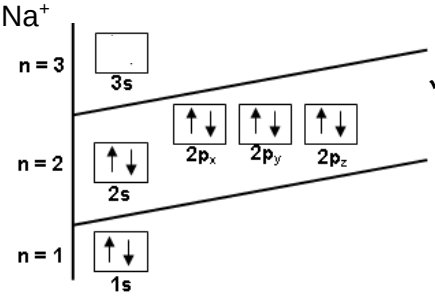
3.6.1. covalent bond / *kovalente binding*✓ (1)

3.6.2. metallic bond/ *metaalbinding* ✓ (1)

3.6.3. ionic bond / *ioniese binding* ✓ (1)

3.7. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$ ✓✓ (2)

3.8. Na^+



✓✓ (*the 3s orbital does not have to be drawn /die 3s orbitaal kan ook weggelaat word)* (2)

3.9. 18✓ (1)

3.10. 1✓ (1)

[17]

QUESTION 4 / *VRAAG 4*:

4.1.1. Homogeneous mixture / *Homogene mengsel* ✓ (1)

4.1.2. compound / *verbinding* ✓ (1)

4.1.3. Homogeneous mixture / *Homogene mengsel* ✓ (1)

4.1.4. Heterogeneous mixture / *Heterogene mengsel* ✓ (1)

4.2. A homogeneous mixture is a mixture of uniform composition and in which all components are in the same phase / It is a micture of uniform composition (the same throughout) and where the different components cannot be distinguished from each other✓✓

'n Homogene mengsel is 'n mengsel met 'n uniforme samestelling en waarin alle komponente in dieselfde fase is/ Is 'n mengsel wat uniform (deurgaans dieselfde) is, en waar die verskillende komponente nie van mekaar onderskei kan word nie. ✓✓ (2)

4.3.1. physical change / *fisiese verandering*, ✓ (1)

4.3.2. physical change / *fisiese verandering*, ✓ (1)

4.4.1. metal, ✓ metals are strong/ metals are maleable and ductile ✓
metaal, metale is sterk / metale is buigbaar en rekbaar (2)

4.4.2. non-metal, ✓ non-metals are good insulators against heat/ weak conductors of heat ✓
nie-metaal, nie-metale is goeie isolators/swak geleiers van warmte (2)

[12]

QUESTION 5 / *VRAAG 5:*

5.1.1. potassium hydroxide / *kaliumhidroksied* ✓ (1)

5.1.2. kaliumsulphide / *kaliumsulfied* ✓ (1)

5.1.3. copper(II)nitrate / *koper(II)nitraat* ✓ (1)

5.2.1. NH_4NO_3 ✓ (1)

5.2.2. $Cu_3(PO_4)_2$ ✓ (1)

5.3. H_2S + **2** KOH → **2** H_2O + K_2S ✓✓ (2)

5.4. Law of conservation of mass / Law of conservation of atoms ✓
Wet van behoud van massa / wet van behoud van atome ✓ (1)

[8]

QUESTION 6 / *VRAAG 6:*

6.1. 58 ºC ✓ (1)

6.2. Boiling point is the temperature where the vapour pressure of the liquid is equal to external /atmospheric pressure ✓✓

Kookpunt: die temperatuur waar die dampdruk van die vloeistof gelyk is aan die eksterne/ atmosferiese druk✓✓ *(*2)

6.3. liquid / *vloeistof* ✓ (1)

6.4. boiling / liquid to gas / *kook / vloeistof na gas* ✓ (1)

6.5. a phase change is taken place, ✓ energy is being used to weaken bonds between particles✓

'*n fase verandering is besig om plaas te vind* ✓*energie word gebruik om die kragte tussen deeltjies te verswak.* ✓

6.6.1. 28 - 32 min ✓ (1)

6.6.2. 20 - 26 min ✓ (1)

[9]

QUESTION 7 / *VRAAG 7:*

7.1. Ionisation energy is the energy needed per mole to remove an electron from an atom in the gaseous phase✓✓

Ionisasie energie is die energie benodig per mol om 'n elektron uit 'n atoom in gastoestand te verwyder. ✓✓ (2)

7.2. It decreases because the amount of energy levels increase, ✓the valence electrons is further from the nucleus so it will be easier to remove them/ it will take less energy to remove the valence electrons ✓

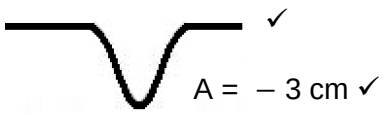
Dit verminder omdat die aantal energie vlakke vermeerder ✓ die valens elektrone is verder weg van die kern en sal makliker wees om te verwyder/ dit sal minder energie vat om die valens elektrone te verwyder. ✓ (2)

7.3. Group 2 elements have 2 valence electrons while group 1 only has 1/ the second electron of group 1 is a core electron. ✓ it will take much more energy to remove a core electron. ✓

Groep 2 se elemente het 2 valenselektrone terwyl groep 1 net 1 het/ groep 1 se tweede elektron is 'n binne elektron ✓dit sal baie meer energie vat om groep 1 se tweede elektron te verwyder omdat dit 'n binne elektron is. ✓ (2)

[6]

QUESTION 8 / ***VRAAG 8:***

8.1. 

X + Y (2)

8.2. Destructive interference / *destruktiewe interferensie* ✓ (1)

8.3. Stay the same / *bly dieselfde* ✓ (1)

8.4. Transverse wave is a wave in which the particles of the medium vibrate at right angles to the direction of motion of the wave / Transverse wave is a wave in which the disturbance of the particles is perpendicular to the propagation direction ✓✓

Transversale golf is 'n golf waarin die deeltjies van die medium reghoekig/loodreg tot die beweginsrigting van die golf vibreer. / Transversale golf is 'n golf waarin die versteuring van die deeltjies loodreg is met die voortplantingsrigting. ✓✓ (2)

8.5. λ = 16 cm ÷ 8 ✓ = 2 cm = 0,02 m✓ (2)

8.6. **Positive marking from question 8.5. /** ***Positiewe nasien vanaf vraag 8.5.***

$v = \lambda f$ ✓
$0,5 = 0,02 \times f$ ✓
$f = 25$ Hz ✓ (3)

8.7. **Positive marking from question 8.5. and 8.6. /** ***Positiewe nasien vanaf vraag 8.5 en 8.6***

$T = \frac{1}{f}$ ✓
$T = \frac{1}{25}$ ✓
$T = 0,04$ s ✓

or / *of*

$v = \frac{\lambda}{T}$
$0,5 = \frac{0,02}{T}$
$T = 0.04$ s (3)

[14]

QUESTION 9 / *VRAAG 9:*

9.1. longitudinal / *longitudinaal* ✓ (1)

9.2. to their advantage, ✓ the time will be shorter / their running time will be quicker/ soundwaves moves much slower than lightwaves ✓

tot hulle voordeel, ✓ die tyd gaan korter wees / hulle tyd gaan vinniger wees / klankggolwe beweeg baie stadiger as liggolwe ✓ (2)

9.3. speed / *spoed* = $\frac{\text{distance/ afstand}}{\text{time / tyd}}$ ✓

$$340 = \frac{128}{\Delta t} \quad \checkmark$$

Δt = 0,0376 / 0,38 s ✓ (3)

[6]

QUESTION 10 / *VRAAG 10:*

10.1. X-rays / *X-strale* ✓ (1)

10.2. $E = hf$ ✓
$E = (6{,}63 \times 10^{-34})(5{,}8 \times 10^{22})$ ✓
$E = 3{,}845 \times 10^{-11}$ J ✓ (3)

10.3. Frequency is the number of waves /wave pulses per second ✓✓

Frekwensie is die aantal golwe/ golfpulse per sekonde. ✓✓ (2)

10.4. microwaves / *mikrogolwe* ✓ (1)

10.5. ♦ Use handfree kits when talking on the phone
♦ Use the loudspeaker when talking on the phone
♦ keep the cellphone away from your body as much as possible
♦ put the phone on airplane mode when you are playing games on it ✓✓ *any 2*

♦ *Gebruik die luidspreker wanneer oor die foon praat*
♦ *handvrye toestel wanneer oor die foon praat*
♦ *Hou die selfoon weg van jou liggaam.*
♦ *sit die foon op airplane mode wanneer jy spelletjies op dit speel.* ✓✓ e*nige 2* (2)

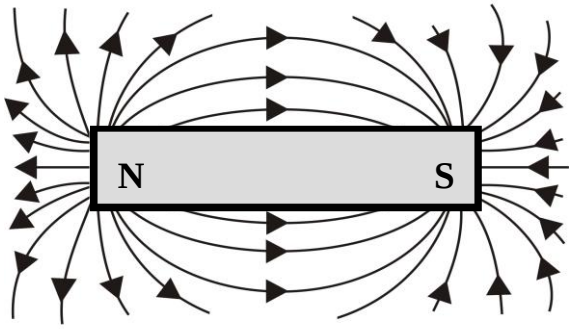
[9]

QUESTION 11 / *VRAAG 11:*

11.1. Magnetic field is a region in space where a magnet or ferromagnetic material will experiences a force ✓✓

Magnetiese veld is 'n gebied in die ruimte waar 'n magneet of ferromagnetiese materiaal 'n krag ondervind ✓✓ (2)

11.2.



✓ shape / *vorm*
✓ direction / *rigting*
✓ lines don't cross/ *lyne kruis nie*
(3)

11.3. Use a compass to find the direction / use a bar magnet to find the north and south pole by finding what sides repels or attracts each other ✓

gebruik 'n kompas om die rigting te bepaal/ gebruik 'n staafmagneet om die noord- en suidpool te bepaal deur te kyk watter kante stoot mekaar af of trek mekaar aan. ✓ (1)

11.4. Nickel has very small magnetic regions called domains, ✓which points in different directions, ✓ when the piece of nickel is moved over the magnet, the domains align themselves with the direction of the magnetic field ✓and becomes a magnet when it is removed.

Nikkel het klein magnetiese areas genoem domeine ✓wat in verskillende rigtings wys, ✓ wanneer dit oor die magneet beweeg word, draai die domeine hulleself in dieselfde rigting as die magneetveld. ✓, en verander ook in 'n magneet. (3)

11.5.1. they will attract each other / *hulle sal mekaar aantrek* ✓ (1)

11.5.2. they will repel each other / *hulle sal mekaar afstoot* ✓ (1)

[11]

QUESTION 12 / *VRAAG 12:*

12.1. $n = \frac{Q}{q_{e^-}}$ ✓

$3{,}75 \times 10^{13} = \frac{Q}{-1{,}6 \times 10^{-19}}$ ✓

$Q = -6 \times 10^{-6}$ C ✓ (3)

12.2. positive, ✓ opposite charges attracts each other ✓
positief, ✓teenoorgestelde ladings trek mekaar aan ✓ (2)

12.3. The nett charge of an isolated system remains constant during any physical process ✓✓

Die netto lading van 'n geïsoleerde/geslote sisteem/stelsel bly konstant gedurende enige fisiese proses ✓✓ (2)

12.4. when the two spheres touch they share the charge equally between them/ they get the same charge ✓and like charges repel ✓

wanneer die twee sfere mekaar raak, deel hulle die lading tussen hulle gelykop/ hulle kry dus dieselfde lading ✓en sal mekaar afstoot. ✓ (2)

12.5. **Positive marking from question 12.1. / *Positiewe nasien vanaf vraag 12.1.***

$Q = \frac{Q_1 + Q_2}{2}$ ✓

$+2 \times 10^{-6} = \frac{-6 \times 10^{-6} + Q_2}{2}$ ✓

$Q = +1 \times 10^{-5}$ C ✓ (3)

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

[13]

QUESTION 13 / *VRAAG 13:*

13.1. $R_T = 6 + 6$ ✓
$R_T = 12\ \Omega$ ✓ (2)

13.2. $I = \frac{V}{R}$ ✓

$I = \frac{12}{12}$ ✓

$I = 1\ A$ ✓ (3)

13.3. **Positive marking from question 13.2. / *Positiewe nasien vanaf vraag 13.2***

$V = IR$ ✓

$V = (1)(6)$ ✓

$V = 6\ V$ ✓ (3)

13.4. **Positive marking from question 13.2. / *Positiewe nasien vanaf vraag 13.2***

$Q = I \times \Delta t$ ✓ $\Delta t = 3 \times 60 = 180\ s$

$Q = 1 \times 180$ ✓

$Q = 180\ C$ ✓ (3)

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

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

$\frac{1}{R_p} = \frac{2}{6}$

$R_p = 3\ \Omega$ ✓ (3)

13.6 Increase✓/ *neem toe* (1)

13.7. • the resistance decrease when the switch is closed ✓
• current is inversely proportional to resistance thus the current increase / it is easier for the current to flow, thus the current increase ✓

• *die weerstand neem af wanneer die skakelaar toegemaak word,* ✓
• *stroom is omgekeerd eweredig aan weerstand, so stroom neem toe/ dis makliker vir die stroom om te vloei, dus neem stroom toe* ✓ (2)

[17]

GRAND TOTAL / *GROOT TOTAAL:* 150