GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

JUNE / *JUNIE* 2018

GRADE / *GRAAD* 10

PHYSICAL SCIENCES /
FISIESE WETENSKAPPE

PAPER / *VRAESTEL* 2

MEMORANDUM

TIME / *TYD*: 90 min

MARKS / *PUNTE*: 100

7 pages / *bladsye*

SECTION A / *AFDELING A*

QUESTION 1 / *VRAAG 1*

1.1 A ✓✓ (2)

1.2 D ✓✓ (2)

1.3 A ✓✓ (2)

1.4 B ✓✓ (2)

1.5 A ✓✓ (2)

1.6 C ✓✓ (2)

1.7 A ✓✓ (2)

1.8 C ✓✓ (2)

1.9 A ✓✓ (2)

1.10 D ✓✓ (2)

[20]

TOTAL SECTION A / *TOTAAL AFDELING A*: 20

SECTION B / *AFDELING B*

QUESTION 2 / *VRAAG 2*

2.1
- Strength ✓
- Thermal conductivity ✓
- Electrical conductivity✓
- Brittleness, malleability, ductility ✓
- Magnetic properties✓
- Density ✓
- Boiling point ✓
- Melting point ✓

Any four(4)
Enige vier(4)

- *Sterkte* ✓
- *Termiese geleivermoë* ✓
- *Elektriese geleivermoë* ✓
- *Brosheid, smeebaarheid & rekbaarheid* ✓
- *Magnetiese eienskappe* ✓
- *Digtheid* ✓
- *Kookpunt* ✓
- *Smeltpunt* ✓ (4)

2.2 A Homogenous mixture consists of substances are evenly distributed throughout the mixture✓, while a heterogenous mixture consists of substances that are visibly different / not uniform✓

'n Homogene mengsel is stowwe wat eweredig deur die mengsel versprei is ✓ terwyl 'n heterogene mengsel stowwe is wat sigbaar van mekaar verskil / nie gelyk versprei (nie-uniform). ✓ (2)

2.3 2.3.1 To gradually pour the saltwater from Erlenmeyer flask into another, in order to separate out the sand.✓

Giet geleidelik die sand van die Erlenmeyer fles na 'n ander houer, om die sand uit te skei. ✓ (1)

2.3.2 Through evaporation. ✓ The water will evaporate into gas leaving the salt in the bottom of the container✓

Deur verdamping. ✓*Die water sal verdamp (in gas) en die sout onder in die houer agterlaat.* ✓ (2)

2.4
- Metallic atoms packed tightly & orderly into a metallic crystal lattice✓
- Few electrons with low ionization energies in outer orbitals✓
- Each metal atom loses control over outer electrons & electrons become localized✓
- Held together by free-moving electrons that act as electrostatic glue✓

- *Metaalatome is dig en ordelik gepak in 'n metaalkristalrooster*✓
- *Min elektrone met lae ionisasie-energie in buitenste orbitale*✓
- *Elke metaalatoom verloor beheer oor buitenste elektrone & elektrone word gedelokaliseerd*✓
- *Bymekaar gehou deur vrybewegende elektrone wat as elektrostatiese gom optree*✓ (4)

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QUESTION 3 / *VRAAG 3*

3.1 3.1.1 E✓ (1)

3.1.2 A✓ (1)

3.1.3 C✓ (1)

3.2 SEE ATTACHED GRAPH PAGE 8
SIEN AANGEHEGTE GRAFIEK BLADSY 8 (5)

[8]

QUESTION 4 / *VRAAG 4*

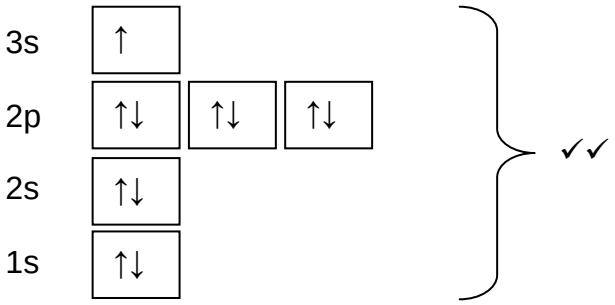
4.1 Alkali metals / *Alkali-metale* ✓ (1)

4.2 Atomic number ✓– reflects to the amount of protons (positive particles) each atom has ✓

Atoomgetal ✓– dui die hoeveelheid protone (positiewe deeltjies) wat elke atoom bevat ✓ (2)

4.3 $M[Ca(OH_2)] = 40$ ✓ + (16 x 2) ✓ + (1 x 2) ✓ = 74 $g.mol^{-1}$ ✓

4.4 Aufbau diagram :



Electron configuration / *Elektron konfigurasie*:

$1s^2 2s^2 2p^6 3s^1$ ✓ (3)

4.5

(2)

4.6 Ionic bonding / *Ioniese binding* ✓ (1)

4.7 4.7.1 Aluminium Ioon / *Aluminium Ioon* ✓ (1)

4.7.2 Manganese / *Mangaan* ✓ (1)

4.7.3 Silver ion / *Silverioon* ✓ (1)

4.7.4 Hydrogencarbonate ion / *Waterstofkarbonaat-ioon* ✓ (1)

4.7.5 Magnesium sulphate / *Magnesiumsulfaat* ✓ (1)

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QUESTION 5 / *VRAAG 5*

5.1 11 (1)

5.2 12 (1)

5.3 6 (1)

5.4 14 (1)

5.5 18 (1)

5.6 19 (1)

5.7 19 (1)

5.8 10 (1)

5.9 Ar (accept Argon / *aanvaar Argon*) (1)

5.10 F (accept Fluorine / *aanvaar Fluoor*) (1)

5.11 Na (accept Sodium / *aanvaar Natrium*) (1)

5.12 F (accept Fluorine / *aanvaar Fluoor*) (1)
[12]

QUESTION 6 / *VRAAG 6*

6.1 Carbon atoms Bond covalently (electronegativity) ✓✓ carbon can form 4 bonds(aufbau- exited state)✓ this allows carbon to form long chains✓

Koolstofatome is kovalent (electronegatiweteit) ✓✓koolstof kan 4 verbindings om een koolstofatoom vorm✓dit stel koolstof in staat om lang kettings te vorm.✓ (4)

6.2
- Electrons in rings become delocalised and are free to move✓
- Free electrons make good conductors of electricity & heat✓

- *Elektrone in ringe word gedelokaliseerd en is vry om te beweeg ✓*
- *Vry elektrone maak goeie geleiers van elektrisiteit & hitte. ✓* (2)

6.3 Diamond / *Diamant ✓* (1)

6.4 Same amount of Protons / atomic number ✓
Different amounts of Neutrons, ✓ $_6C^{12}$ *compared to* $_6C^{14}$✓ (any isotope as long as its carbon)

Dieselfde aantal protone / atoomgetal ✓
getal neutrone verskil / massa getalle verskil✓ $_6C^{12}$ *teenoor* $_6C^{14}$ *✓(enige koolstof isotoop)* (3)
[10]

QUESTION 7 / *VRAAG 7*

7.1

Any two(2)
Enige twee(2)

- Colour change✓
- Formation of a gas✓
- Formation of a solid (precipitation) ✓
- Change in temperature (release or absorption of heat) ✓

- *Kleurverandering* ✓
- *Vorming van 'n gas*✓
- *Vorming van 'n solied (presipitasie)* ✓
- *Verandering in temperatuur (vrystel of absorpsie van hitte)* ✓ (2)

7.2 A physical change you can see physically with the eye while with a chemical change has a new substance with new properties✓

'n Fisiese verandering kan fisies met die blote oog gesien word terwyl 'n chemiese verandering nie met die blote oog gesien kan word nie, 'n nuwe stof met 'n nuwe karakter word geskep✓ (1)

7.3 Law of Constant composition states that elements always combine in the same <u>proportion</u> with each other. ✓✓

Wet van konstante samestelling stateer dat elemente altyd in dieselfde <u>verhouding</u> tot mekaar kombineer ✓✓ (2)

7.4 A decomposition reaction is when a single compound breaks down to give 2 more simpler substances;✓ a synthesis reaction is when reactants react to form a new product. ✓

'n Ontbindingsreaksie is wanneer 'n enkele verbinding afbreek om 2 meer eenvoudiger stowwe te vorm,✓ *terwyl 'n sintese reaksie reagense met mekaar reageer om 'n nuwe produk te vorm*✓ (2)

[7]

QUESTION 8 / *VRAAG 8*

8.1 $Al_2(SO_4)_3$ ✓✓ (2)

8.2 $4Fe^{+3} + 3\ O_2$ ✓ $\rightarrow 2Fe_2O_3$ ✓ Balancing / *Balansering* ✓ (3)

8.3 8.3.1 800 kJ mol^{-1}, must have a unit for one mark. / *moet 'n eenheid hê om die punt te verdien* ✓ (1)

8.3.2 Al is a metal and Cl is a non-metal / *Al is 'n metaal en Cl is 'n nie-metaal* ✓✓ (2)

8.3.3 A decrease / *afname* ✓✓ (2)

8.3.4 They are noble gases ✓ and therefore do not take part in chemical bonding ✓ / *Hulle is edelgasse* ✓ *en is daarom nie deel van chemiese binding nie.* ✓ (2)

[12]

TOTAL SECTION B / *TOTAAL AFDELING B:* 80

QUESTION 3.2 / *VRAAG 3.2*

Marking guideline / *merk riglyn*
- ✓ Heading / *Opskrif*
- ✓ Coordinates + units / *koördinate + eenhede*
- ✓ 7 points plotted correct / *7 punte korrek gestip*
- ✓ 6 points plotted correct / *6 punte korrek gestip*
- ✓ points connected (correct shape) / *punte konnekteer (regte vorm)*

Heating Curve / *Verhittingskurwe* ✓