GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION /

GAUTENGSE DEPARTEMENT VAN ONDERWYS

PROVINCIAL EXAMINATION / *PROVINSIALE EKSAMEN*

JUNE / *JUNIE* 2017

GRADE / *GRAAD* 10

PHYSICAL SCIENCES P2
FISIESE WETENSKAPPE V2

CHEMISTRY / *CHEMIE*

MEMORANDUM

7 pages / *bladsye*

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MEMORANDUM

QUESTION / *VRAAG* 1

1.1 C✓✓

1.2 C✓✓

1.3 C✓✓

1.4 C✓✓

1.5 B✓✓

1.6 A✓✓

1.7 D✓✓

1.8 A✓✓

1.9 C✓✓

1.10 C✓✓

(10 x 2) **[20]**

QUESTION / VRAAG 2

2.1 To determine the heating curve of water / *Om die verhittingskurwe van water te bepaal* ✓✓ (2)

2.2 2.2.1 temperature / *temperatuur* ✓ (1)

2.2.2 time / *tyd* ✓ (1)

2.3
- ice and thermometer placed in the beaker / *ys en termometer word in beker geplaas* ✓
- beaker placed on top of tripod stand with wire gauze / *beker word bo-op staander met draad geplaas* ✓
- bunsen burner placed under the tripod stand / *plaas bunsenbrander word onder driepootstaander geplaas*✓
- stop watch used to measure the time interval during heating / *gebruik stophorlosie om tydintervalle te meet.* ✓ (4)

2.4 2.4.1 – Weak forces of attraction ✓
– Average kinetic energy very high due to the amount of heat✓
– Boiling water and gas will be found here✓

Tussen D en E word vloeistof en gas aangetref, die waterstofverbindings (aantrekkingskragte is amper almal gebreek vir hierdie fase verandering. Die gemiddelde kinetiese energie is hoog omrede die hoeveelheid hitte energie. (3)

2.4.2 – Strong forces of attraction ✓
– Average kinetic energy is low✓
– Water is still in its solid phase✓

By punt A, is die aantrekkingskragte baie sterk omrede water nog in soliede fase is. Die gemiddelde kinetiese energie sal laag wees omrede die hoeveelheid hitte energie. (3)

2.5 Physical✓ – no new substances are formed / *Fisies – geen nuwe stowwe word gevorm.* ✓✓ (3)

2.6 No ✓, substance (water) only underwent changes in phase , it remained with constant chemical composition throughout / *Nee, water het slegs fase verander. Dit het konstante chemiese samestelling behou.* ✓✓ (3)
[20]

QUESTION / *VRAAG* 3

3.1 An element is a pure substance that is only made up of one type of particle. ✓✓
A compound is a pure substance that is made up of two or more elements that are chemically bonded together. ✓✓

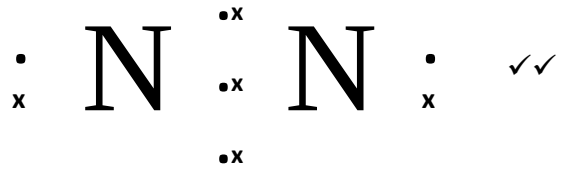
'n Element is 'n stof wat nie opgebreek kan word in eenvoudiger stowwe. Verbinding is 'n stof wat bestaan uit twee of meer elemente wat chemies in 'n vaste verhouding aan mekaar verbind is. (4)

3.2 3.2.1 A✓ (1)

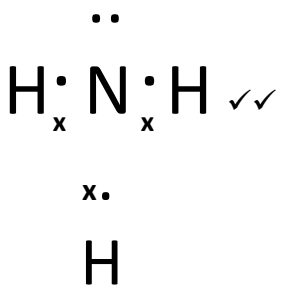
3.2.2 Covalent bond / *Kovalente bindings*✓ (1)

3.2.3 A - N_2✓
B - NO_2✓
C - NH_3✓ (3)

3.2.4



✓✓

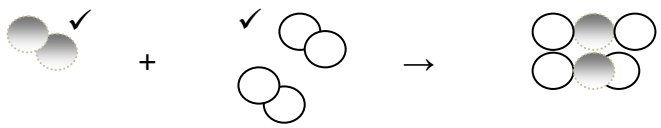


✓✓

(4)

3.2.5 A-Nitrogen / *Stikstof* ✓
B-Nitrogen dioxide / *Stikstofdioksied* ✓
C-Nitrogen hydride / *Waterstofnitried* ✓ (3)

3.2.6



✓✓ balanced equation
gebalanseerde vergelyking (4)

[20]

QUESTION / *VRAAG* 4

4.1 F✓ (1)

4.2 First ionisation energy is the energy required to remove the first electron from an atom in the gaseous phase. / *Eerste ionisasie energie is die energie wat nodig is om 'n elektron uit 'n atoom in die gasfase te verwyder.* ✓✓ (2)

4.3 F✓ (1)

4.4 7 ✓ (1)

4.5 N / Nitrogen / *N / Stikstof* ✓ (1)

4.6 D✓ (1)

4.7 A✓
Boron / *Boor* ✓ (2)
[9]

QUESTION / *VRAAG* 5

5.1 Atoms of the same element that have the same atomic number (number of protons) and different atomic mass numbers (number of neutrons) / *Atome van dieselfde element wat dieselfde atoomgetal (protongetal) en verskillende atoommassa getal (neutrone getal) het* ✓✓ (2)

5.2 2p ↑↓ ↑↓ ↑↓ ✓

2s ↑↓ ✓

1s ↑↓ ✓ (3)

5.3 The mass of an element or compound relative to carbon-12 / *Die massa van 'n element / verbinding relatief tot koolstof-12* ✓✓ (2)

5.4 Assume 100 g of substance / *Aanvaar 100 g van 'n stof*

A_r (Mg) = $\frac{(23{,}985 \times 78{,}99) + (24{,}986 \times 10{,}00) + (25{,}985 \times 11{,}01)}{100}$ ✓✓

= 24,31 ✓✓ (4)

5.5 5.5.1 $1s^2$ $2s^2$ $2p^6$ $3s^2$ ✓✓ (2)

5.5.2 The ionization energy of an element increases as the number of consecutive electrons removed increases. / *Ionisasie-energie van 'n element verhoog soos hoeveelheid opeenvolgende elektrone verwyder, verhoog.* ✓✓ (2)

5.5.3 Valence electrons are the electrons in the outermost orbital that is not completely filled – less energy is required to remove these electrons. ✓✓

Core electrons are electrons found in the inner orbitals of an atom that are completely filled, more energy is required to remove these electrons. ✓✓

Valenselektrone is elektrone in die buitenste orbitale wat nie heeltemal gevul is. Minder energie word benodig om hierdie elektrone te verwyder.

Kern elektrone is elektrone wat in die binneste orbitale gevind word van 'n atoom. Hulle is heeltemal gevul, meer energie word benodig om hierdie elektrone te verwyder. (4)

[19]

QUESTION / *VRAAG* 6

6.1 The total mass of the particles before a reaction and the total mass of the particles after a reaction remain constant (law of conservation of mass). ✓✓

or

During a chemical reaction or a physical change, the sum of the masses of the reactants is equal to the sum of the mass of the products. ✓✓

Die totale massa van stowwe wat deelneem aan 'n chemiese reaksie bly behoue tydens 'n reaksie. (2)

6.2 6.2.1 synthesis / *Sintese* ✓ (1)

6.2.2 $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ (2)

MARKING CRITERIA
both reactants correct & products are correct✓ Balancing ($\underline{3}H_2$ and $\underline{2}NH_3$) ✓ *Albei reagense korrek* *Produkte korrek* *Balansering*

6.3

N_2	+	H_2	→	NH_3
(14+14)	+	(1 + 1)	→	(14+3x1)
(28	+	2)√	→	34√
Before / *Voor*: 30✓			=	After: 34√

Mass before ≠ Mass after / *Massa voor ≠ Massa na* ✓ (5)

6.4 $N_2(g)$ + $\underline{3H_2}(g)$ ✓ → $\underline{2NH_3}(g)$ ✓ (2)

[12]

TOTAL SECTION B / *TOTAAL AFDELING B:* 80

TOTAL / *TOTAAL*: 100