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GRADE 10/GRAAD 10

NOVEMBER 2020

**PHYSICAL SCIENCES P2 (CHEMISTRY)
FISIESE WETENSKAPPE V2 (CHEMIE)
MARKING GUIDELINE/NASIENRIGLYN
(EXEMPLAR/EKSEMPLAAR)**

MARKS/PUNTE: 150

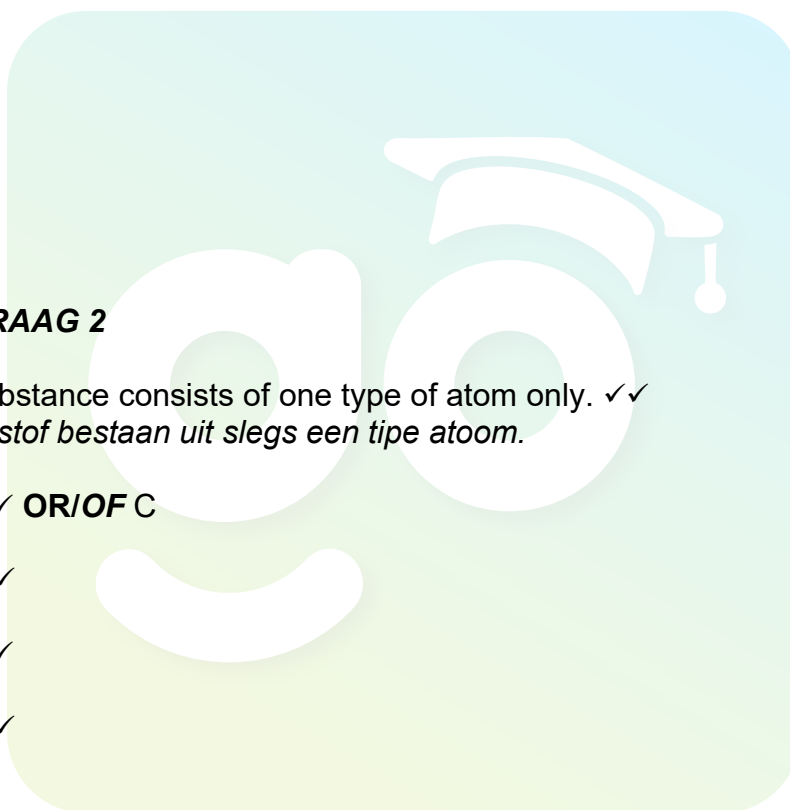
This marking guideline consists of 11 pages.
Hierdie nasienriglyn bestaan uit 11 bladsye.

QUESTION 1/VRAAG 1

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

QUESTION 2/VRAAG 2

- | | | |
|-----|---|------------|
| 2.1 | A pure substance consists of one type of atom only. ✓✓
<i>’n Suiwer stof bestaan uit slegs een tipe atoom.</i> | (2) |
| 2.2 | 2.2.1 A ✓ OR/OF C | (1) |
| | 2.2.2 C ✓ | (1) |
| | 2.2.3 B ✓ | (1) |
| | 2.2.4 D ✓ | (1) |
| | | [6] |



QUESTION 3/VRAAG 3

- 3.1 The temperature at which a solid, given sufficient heat, becomes a liquid. ✓✓
Die temperatuur waarteen 'n vastestof na 'n vloeistof verander as dit genoeg hitte ontvang. (2)
- 3.2 3.2.1 Between / Tussen D and / en E ✓/ DE (1)
- 3.2.2 Gas ✓ (1)
- 3.2.3 Melting/ Smelting ✓ (1)
- 3.3 Unchanged, ✓ the temperature of the substance stays constant .✓ / The temperature of the substance does not increase nor decrease.
Bly dieselfde. Die temperatuur van die stof bly konstant. / Die temperatuur van die stof verhoog of verlaag nie. (2)
- 3.4 Increases ✓
Verhoog (1)
- [8]**



QUESTION 4/VRAAG 4

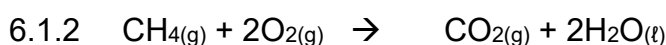
- 4.1 The number of protons in an atom of an element. ✓
Die aantal protone in 'n gegewe element. (1)
- 4.2 Group/Groep 2/(II) ✓ and/ en Period/Periode 3 ✓ (2)
- 4.3 ${}^{24}_{12}\text{Mg}$ ✓✓ (2)
- 4.4 It will become a cation / Mg^{2+} ✓
Dit word 'n katioon / Mg^{2+} (1)
- 4.5 $1s^2 2s^2 2p^6$ ✓✓ (2)
- 4.6 Remains the same / *Bly dieselfde* ✓ (1)
- [9]**

QUESTION 5/VRAAG 5

- 5.1 Energy per mole needed to remove (an) electron(s) from an atom in the gaseous phase. ✓✓
Energie per mol benodig om elektron(e) van 'n atoom in die gasfase te verwyder. (2)
- 5.2 5.2.1 (a) Beryllium/Berillium ✓ (1)
- (b) Earth-alkali metals / *Aard-alkalimetale* ✓ (1)
- (c) He ✓ (1)
- 5.2.2 There is an increase in the number of protons from lithium to beryllium across a period ✓ that will lead to an increase in nuclear charge ✓ that will hold electrons in energy level tightly.
Daar is 'n toename in die aantal protone van litium tot berillium tydens 'n periode wat sal lei tot 'n toename in kernlading wat elektrone op energievlak naby mekaar sal hou. (2)
- 5.3 Increases. ✓ The nuclear charge of atoms from left to right across the period of the periodic table increases as the atoms become smaller, causing the nucleus to attract electrons strongly towards it. ✓
Toeneem. Die kernlading van atome van links na regs oor die periode van die periodieke tabel neem toe soos die atome kleiner word, wat veroorsaak dat die elektrone sterk na die kern getrek word. (2)
- [9]**

QUESTION 6/VRAAG 6

6.1 6.1.1 The sharing of electrons between atoms to form molecules. ✓✓
Die deel van elektrone tussen atome om molekules te vorm. (2)

**Marking guidelines/Nasienriglyne**

Reactants/ Reaktante ✓

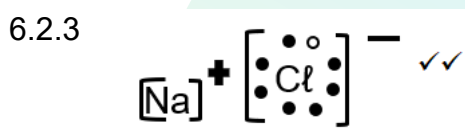
Products / Produkte ✓

Balanced / Gebalanseerd ✓

(3)

6.2 6.2.1 NaCl ✓ (1)

6.2.2 Ionic bond/Ioniese verbinding ✓ (1)

(2)
[9]**QUESTION 7/VRAAG 7**

7.1 A group of two or more different atoms ✓ that attract each other by relatively strong forces or bonds ✓
'n Groep van twee of meer verskillende atome wat mekaar aantrek deur relatiewe sterk kragte of bindings (2)

7.2 7.2.1 B ✓ (1)

7.2.2 C ✓ (1)

7.2.3 A ✓ (1)

7.2.4 E ✓ (1)

7.2.5 D ✓ (1)

7.2.6 F ✓ (1)

7.3 Covalent bond/Kovalente verbinding ✓ (1)

7.4 7.4.1 D ✓ (1)

7.4.2 B ✓ and/en F ✓ (2)

7.4.3 E ✓ (1)

7.5 7.5.1 B ✓ and/en F ✓ (2)

7.5.2 E ✓ (1)

7.5.3 B ✓ (1)

- 7.6 Molecular structure consists of molecules formed when atoms share electrons due to intermolecular forces between them, ✓ and giant molecular structure consists of atoms covalently bonded together to form a giant repeating lattice. ✓

Molekulêre struktuur bestaan uit molekules wat gevorm word wanneer atome elektrone deel as gevolg van intermolekulêre kragte tussen hulle, en reuse molekulêre struktuur bestaan uit atome wat kovalent aan mekaar verbind is om 'n reuse herhalende rooster te vorm.

(2)

[19]

QUESTION 8/VRAAG 8

8.1 $\text{H}_2\text{O}_{(l)} \checkmark \rightarrow \text{H}_2\text{O}_{(g)} \checkmark$ (2)

8.2 Distillation / *Distillasie* ✓
Evaporation / *Verdamping* ✓
Filtration / *Filtrasie* ✓ (3)

8.3 8.3.1 (a) What is the relationship between the mass of magnesium and that of magnesium oxide? ✓✓
Wat is die verhouding tussen die massa van magnesium en magnesiumoksied? (2)

(b) Mass of magnesium / *Massa van magnesium* ✓ (1)

(c) Mass of magnesium oxide / *Massa van magnesiumoksied* ✓ (1)

(d) Oxygen gas / *Suurstofgas* ✓ (1)

8.3.2 Synthesis ✓
Two reactants react to form one product ✓
Sintese
Twee reaktante reageer om een produk te vorm (2)

8.3.3 Exothermic / *Eksotermies* ✓ (1)

8.3.4 Mass cannot be created nor destroyed ✓✓ / total mass of the reactants equals the total mass of the products.
Massa kan nie vervaardig of vernietig word nie / totale massa van die reaktante is gelyk aan die totale massa van die produkte. (2)

8.3.5 M_r of reactants / *van reaktante*
 $= 2(24) + 2(16)$
 $= 48 + 32 \checkmark$
 $= 80$
 M_r of products / *van produkte*
 $= 2(24+16)$
 $= 2(40) \checkmark$
 $= 80$

M_r of reactants / *van reaktante* = M_r of products / *van produkte* ✓ (4)

8.3.6 (a) Product / *Produkte* ✓ (1)

(b) $m(\text{MgO}) = m(\text{Mg}) + m(\text{O})$
 $20 \text{ g} = 5 \text{ g} + m(\text{O}) \checkmark$
 $m(\text{O}) = 20 \text{ g} - 5 \text{ g}$
 $m(\text{O}) = 15 \text{ g} \checkmark$
 $\%(\text{O}) = 15/20 \times 100 \checkmark$
 $\%(\text{O}) = 75\% \checkmark$ (4)

[24]

QUESTION 9/VRAAG 9

9.1 Water of crystallisation / *Water van kristallisasie* ✓ (1)

9.2 9.2.1 AS/ WS = 100 – 30,6
= 69,4%

$$n(\text{H}_2\text{O}) = \frac{30,6}{18} = 1,70 \text{ mol}$$

$$n(\text{AS}) = \frac{69,4}{100} = 0,696 \text{ mol} \quad \checkmark$$

Whole number ratio / *Heelgetal-verhouding*

$$\frac{0,696}{0,696} : \frac{1,70}{0,696}$$

$$\text{AS: H}_2\text{O} = 1:2,44$$

$$\text{AS: H}_2\text{O} = 1:2 \quad \checkmark$$

$$\therefore \text{AS} \cdot 2\text{H}_2\text{O} \checkmark / n = 2$$

(3)

9.2.2 (a) Ca ✓ (1)

(b) (Group/*Groep*) 2 ✓ (1)

9.2.3 CaCO_3 ✓✓ (2)

9.3 9.3.1 Ratio / *Verhouding*:

$$2n(\text{NaCl}) = 6$$

$$n(\text{NaCl}) = 3 \text{ mol}$$

$$n(\text{NaCl}) = \frac{6}{2}$$

OR/OF

$$n(\text{NaCl}) = 3 \text{ mol}$$

$$n(\text{NaCl}) = \frac{m}{M} \checkmark$$

$$3 = \frac{m}{58,5} \quad \checkmark$$

$$m = 175,5 \text{ g} \quad \checkmark$$

(3)

9.3.2 Ratio / Verhouding:

$$2n(\text{Cl}) = 3$$

$$n(\text{Cl}) = \frac{3}{2}$$

$$n(\text{Cl}) = 1,5 \text{ mol}$$

$$n(\text{Cl}) = \frac{V}{V_m} \checkmark$$

$$1,5 \checkmark = \frac{V}{22,4} \checkmark$$

$$V = 33,6 \text{ dm}^3 \checkmark$$

(4)

9.4

$$\left. \begin{array}{l} n(\text{Na}) = \frac{29}{23} = 1,26 \\ n(\text{S}) = \frac{40,5}{32} = 1,27 \\ n(\text{O}) = \frac{30,4}{16} = 1,9 \end{array} \right\} \checkmark$$

Whole number ratio / Heelgetal-verhouding

$$\frac{1,26}{1,26} : \frac{1,27}{1,26} : \frac{1,9}{1,26} \checkmark$$

$$\text{Na:S:O} = 1: 1: 1,5$$

Whole number / Heelgetal 2:2:3 ✓

Empirical formula / Empiriese formule = $\text{Na}_2\text{S}_2\text{O}_3$ ✓(4)
[19]

QUESTION 10/VRAAG 10

- 10.1 10.1.1 A solution that contains ions and can conduct electricity. ✓✓
'n Oplossing wat ione bevat en elektrisiteit kan gelei. (2)
- 10.1.2 Na^+ and/en Cl^- ✓ (one mark for both ions / een punt vir beide ione) (1)
- 10.1.3 Increases. ✓ Calcium chloride consists of three ions where sodium chloride consists of two ions; therefore the concentration of ions ✓ in the solution increases, which will result in an increase in conductivity. ✓
Vermeerder. Kalsiumchloried bestaan uit drie ione waar natriumchloried uit twee ione bestaan; dus die konsentrasie van ione in die oplossing neem toe, en dit sal lei tot 'n toename in geleidingsvermoë. (3)
- 10.2 10.2.1 B. ✓ iodide ions have been exchanged for the chloride ions ✓
B. jodied-ione is vir die chloried-ione verruil (2)
- 10.2.2 A. ✓ Each Mg atom has lost 2 electrons, one to each of the Cl atoms. ✓
A. Elke Mg-atoom het 2 elektrone verloor, een vir elk van die Cl-atome. (2)
- 10.3 10.3.1 $\text{CaCO}_{3(s)} \checkmark \rightarrow \text{Ca}^{2+}_{(aq)} + \text{CO}_3^{2-}_{(aq)} \checkmark$ (2)
- 10.3.2 Silver nitrate / *Silwernitraat* ✓ (1)
- 10.3.3 NaCl : white precipitate / *wit neerslag* ✓
 NaBr : cream-coloured / *roomkleurig* ✓
 NaI : yellow / *geel* ✓ (3)
- 10.3.4 (a) Calcium carbonate / *Kalsiumkarbonaat* ✓ (1)
- (b) Sodium sulphate / *Natriumsulfaat* ✓ (1)
- 10.3.5 Acid-base / *Suur-basis* ✓ (1)

[19]

QUESTION 11/VRAAG 11

- 11.1 Hydrosphere / *Hidrosfeer* ✓ (1)
- 11.2 The process whereby water falls ✓ from the clouds to the ground in various forms, ✓ such as rain, hail, snow or water.
Die proses waardeur water van die wolke af tot in die grond val in verskillende vorme soos reën, hael, sneeu of water. (2)
- 11.3 Transpiration / *Transpirasie* ✓ (1)
- 11.4 Through percolation, water is filtered and stored ✓ in underwater lakes and rivers.
Deur middel van deurdringing, word water gefiltreer en gestoor in onderwatermere en riviere. (1)
- 11.5 Evaporation / *Verdamping* ✓ (1)
- 11.6 Excessive use of water and extraction of water from existing water sources. ✓ Pollution of water sources ✓
Oormatige gebruik van water en onttrekking van water uit bestaande waterbronne. Besoedeling van waterbronne. (2)

[8]**TOTAL/TOTAAL: 150**