



education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT/ PROVINSIALE ASSESSERING

GRADE/GRAAD 10

PHYSICAL SCIENCES: CHEMISTRY (P2)
FISIESE WETENSKAPPE: CHEMIE (V2)

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MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 100



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QUESTION/VRAAG 1

- | | | | |
|-----|---|----|-------------|
| 1.1 | C | ✓✓ | (2) |
| 1.2 | B | ✓✓ | (2) |
| 1.3 | B | ✓✓ | (2) |
| 1.4 | C | ✓✓ | (2) |
| 1.5 | D | ✓✓ | (2) |
| 1.6 | A | ✓✓ | (2) |
| 1.7 | C | ✓✓ | (2) |
| | | | [14] |

QUESTION/VRAAG 2

- | | | | |
|-----|-------|--|------------|
| 2.1 | 2.1.1 | C/Phosphorus/fosfor ✓ | (1) |
| | 2.1.2 | A/Cobalt/Kobalt ✓ OR B/Gold/Goud ✓ | (1) |
| | 2.1.3 | A/Cobalt/Kobalt ✓ | (1) |
| | 2.1.4 | D/Silicon/Silikon ✓ | (1) |
| | 2.1.5 | NH ₄ NO ₃ ✓✓ | (2) |
| 2.2 | 2.2.1 | Aluminium is a metal that is a thermal conductor./ <i>Aluminium is a metaal wat 'n termiese geleier is.</i> ✓
OR/OF
Aluminium allows heat to pass through easily./ <i>Aluminium laat toe dat hitte maklik deur dit gaan.</i> ✓ | (1) |
| | 2.2.2 | Plastic is a thermal insulator./ <i>Plastiek is nie 'n termiese geleier nie.</i> ✓
OR/OF
Plastic does not allow heat to pass through it./ <i>Plastiek laat nie toe dat hitte deur dit gaan nie.</i> ✓ | (1) |
| | | | [8] |

QUESTION/VRAAG 3

- | | | |
|-----|--|-----|
| 3.1 | Measure of the average kinetic energy of the particles./ <i>Die gemiddelde kinetiese energie van deeltjies.</i> ✓✓ | (2) |
| 3.2 | Thermometer/Termometer ✓ | (1) |
| 3.3 | To distribute the heat evenly in the beaker./ <i>Om te verseker dat die hitte eweredelik versprei word.</i> ✓
OR/OF
To keep uniform temperature throughout./ <i>Om univormige deurgans te behou.</i> ✓ | (1) |

- 3.4 3.4.1 Melting/Smelt ✓ (1)
- 3.4.2 FASTER/VINNIGER ✓
The water now exists in the liquid phase./Die water is nou in die vloeistof fase. ✓ OR/OF
Particles have more kinetic energy./Deeltjies het meer kinetiese energie. ✓ (2)
- 3.4.3 Increase/Toeneem ✓ (1)
- 3.4.4 Yes/Ja ✓ (1)
- 3.4.5 Less than/Minder as ✓ (1)
- [10]

QUESTION/VRAAG 4

- 4.1 4.1.1 Atoms from the same element with the same atomic number but different mass number due to the difference in the number of neutrons. ✓✓ (2 or 0)/
Atome van dieselfde element met dieselfde atoomgetal maar verskillende massagetal as gevolg van 'n verskil in die aantal neutrone. ✓✓ (2 of 0) (2)
- 4.1.2 % abundance of/ O-18 = 100 – (99,76 + 0,04) ✓
% oorsvloed van = 0,2 ✓ (2)
- 4.1.3 Relative atomic mass/Relatiewe atoommassa

$$= \frac{(99,76 \times 16) \checkmark + (0,04 \times 17) \checkmark + (0,2 \times 18) \checkmark}{100}$$
 = 16,0044 ✓ (Accept/Aanvaar: 16,00) (4)
- 4.2 4.2.1 Metallic bond/Metaal binding ✓ (1)
- 4.2.2 Aluminium is ductile ✓ as aluminium has an ability to be stretched into a wire. ✓
OR
Aluminium is malleable ✓ as aluminium has an ability to be hammered into shape without breaking. ✓/
Aluminium is rekbaar ✓ omdat aluminium die vermoë het om in lang drade gestrek te word. ✓
OF
Aluminium is smeerbaar ✓ omdat aluminium die vermoë het om in verskillende vorms gehammer te word. ✓ (2)
- 4.2.3 Aluminium nitride/Aluminium nitried ✓ (2)
- 4.2.4 $\text{Al} \cdot \checkmark + \cdot \ddot{\text{N}} \cdot \checkmark \longrightarrow \text{Al}^{3+} \checkmark \left[\ddot{\text{N}} \right]^{3-} \checkmark$ (4)
- [17]

QUESTION 5

- 5.1 The (minimum) energy per mole required to remove an electron from an atom in the gaseous phase. ✓✓ (2 or 0)/
Die (minimum) energie per mol benodig om 'n elektron van 'n atoom in die gasfase te verwyder. ✓✓ (2 of 0) (2)
- 5.2 Ionisation energy will increase from sodium to argon (Na to Ar).
/ Ionisasie energie sal toeneem van natrium tot argon (Na na Ar) ✓ (1)
- 5.3
- Chlorine has a greater first ionisation energy than magnesium. ✓/
Chloor het 'n groter eerste ionisasie energie in vergelyking met magnesium. ✓
 - Chlorine and magnesium have the same number of energy levels but chlorine has more protons and electrons than magnesium. ✓/
Chloor en magnesium het dieselfde aantal energie vlakke maar chloor het meer protone en elektrone as magnesium. ✓
 - Therefore the chlorine nucleus attracts the valence electrons more strongly ✓ than the magnesium nucleus./
Gevolglik sal die chloor nukleus die valens elektrone sterker aantrek ✓ as die magnesium nukleus.
 - More energy is needed in magnesium than in chlorine to overcome the (strong) attractive electrostatic force. ✓/
Meer energie word benodig in magnesium as in chloor om die (sterk) elektrostatische aantrekkings kragte te oorkom. ✓ (4)
- 5.4 GREATER THAN/GROTER AS ✓
- The sodium ion has a completely filled outer most energy level ✓ and therefore does not want to lose anymore electrons. / This represents a state of greater stability.
 - The second electron to be removed is closer to the nucleus and will experience a greater force of attraction with the nucleus. ✓ Hence more energy will be needed to overcome/break that force./
 - *Die natrium ioon het 'n gevulde mees buitenste energie vlak ✓ en daarom wil dit nie enige elektrone meer verloor nie. / Dit dui 'n meer stabiele staat aan.*
 - *Die tweede elektron wat verwyder moet word is nader aan die nukleus en ondervind 'n groter aantrekkings krag met die nukleus. ✓ Gevolglik sal meer energie benodig word om die krag te verswak.breek. ✓* (4)

[11]

QUESTION 6

- 6.1 6.1.1 Physical ✓ A phase/state change takes place ✓ the chemical composition of the metal remains the same./
Fisiese ✓ 'n Fase verandering vind plaas. ✓ die chemiese samestelling van die metaal bly dieselfde. (2)
- 6.1.2 Physical/Fisiese ✓ (1)
- 6.1.3 Chemical/Chemiese ✓ (1)
- 6.2 6.2.1 Decomposition/Ontbinding ✓ (1)
- 6.2.2 $2 [207+2(14)+3(16)] \checkmark = 2(207+16) \checkmark + 4[14+2(16)] \checkmark + (2 \times 16) \checkmark$
 $2(207 + 124) = 446 + 184 + 32$
 $662 = 662 \checkmark$ (5)
- 6.2.3 $6,62 \text{ g} - 4,46 \text{ g} \checkmark = 2,16 \text{ g} \checkmark$ (2)
- 6.3 $4 \text{ NH}_3(\text{g}) + 5 \text{ O}_2(\text{g}) \checkmark \rightarrow 4 \text{ NO}(\text{g}) + 6 \text{ H}_2\text{O}(\text{l}) \checkmark$ (2)
- [14]**

QUESTION 7

- 7.1
- | OPTION 1 | OPTION 2 |
|---|--|
| $n(\text{NaCl}) = \frac{m}{M}$
$= \frac{5,85}{58,5} \checkmark$
$= 0,1 \text{ mol}$ | $c(\text{NaCl}) = \frac{m}{MV} \checkmark$
$= \frac{0,1 \checkmark}{58,5(0,5) \checkmark}$
$= 0,2 \text{ mol} \cdot \text{dm}^{-3} \checkmark$ |
| $c(\text{NaCl}) = \frac{n}{V}$
$= \frac{0,1}{0,5} \checkmark$
$= 0,2 \text{ mol} \cdot \text{dm}^{-3} \checkmark$ | |
- (4)

- 7.2
- Water of crystallisation refers to the water molecules that are chemically bonded within the crystal structure of a salt./*Kristalwater verwys na die water molekules wat chemies verbind is aan die kristal struktuur van 'n sout. ✓✓*
 - $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \checkmark$ (Accept any other correct formula/Aanvaar enige ander korrekte formule) (3)

- 7.3 $m(\text{H}_2\text{O}) = 5 - 3 = 2 \text{ g} \checkmark$
- $\% \text{H}_2\text{O} = \frac{\text{mass of water / massa water}}{\text{mass of hydrated salt / massa van die gehidriseerde sout}} \times 100$
 $= \frac{2}{5} \times 100$
 $= 40 \% \checkmark$ (2)
- [9]**

QUESTION 8

- 8.1 The number of particles of a substances that is the same as there are atoms in 12 g of carbon-12. ✓✓ (2 or 0)/
Die aantal deeltjies van 'n stof wat dieselfde is as die hoeveelheid atome in 12 g of koolstof-12. ✓✓ (2 of 0) (2)
- 8.2 Hydrogen nitrate/Waterstof nitraat ✓ (1)
- 8.3
- 8.3.1 $M(\text{NH}_4\text{NO}_3) = 14 + 4(1) + 14 + 3(16)$ ✓
 $= 80 \text{ g.mol}^{-1}$ ✓ (2)
- 8.3.2 $n(\text{NH}_4\text{NO}_3) = \frac{m}{M}$ ✓
 $= \frac{15}{80}$ ✓
 $= 0,19 \text{ mol}$ ✓ (3)
- 8.3.3 $M(\text{NO}) = 14 + 16$
 $= 30 \text{ g.mol}^{-1}$ ✓
 $n(\text{NO}) = \frac{m}{M}$
 $= \frac{12}{30}$ ✓
 $= 0,4 \text{ mol}$
 $V(\text{NO}) = nV_m$ ✓
 $= (0,4)(22,4)$ ✓
 $= 8,96 \text{ dm}^3$ ✓ (5)
- 8.3.4 $N(\text{N}_2) = nN_A$ ✓
 $= 2(6,02 \times 10^{23})$ ✓ (2) ✓
 $= 2,41 \times 10^{24} \text{ nitrogen atoms/stikstof atome}$ ✓ (4)
- [17]**

TOTAL: 100