LIMPOPO

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REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE/*GRAAD* 10

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

JUNE 2025/*JUNIE 2025*

FINAL ERRATA MARKING GUIDELINES/*FINALE ERRATA NASIENRIGLYNE*

MARKS/*PUNTE*:100

This marking guideline consists of 9 pages including cover page./*Hierdie nasienriglyne bestaan uit 9 bladsye, insluitend die voorblad.*

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QUESTION 1/*VRAAG 1*

1.1	C.	✓✓	(2)
1.2	A.	✓✓	(2)
1.3	C.	✓✓	(2)
1.4	D	✓✓	(2)
1.5	B	✓✓	(2)
1.6	A	✓✓	(2)
1.7	D	✓✓	(2)
1.8	C	✓✓	(2)
1.9	C	✓✓	(2)
1.10	D	✓✓	(2)

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QUESTION 2 /*VRAAG 2*

2.1 A pure substance consisting of two or more different elements. ✓✓/ *'n Suiwer stof wat uit twee of meer verskillende elemente bestaan* ***(2 OR 0)*** (2)

2.2 2.2.1 B ✓ (1)

2.2.2 A ✓ (1)

2.3 C ✓

It's a mixture of non-uniform composition and of which the components can be easily identified. ✓/ *Dit is 'n mengsel met 'n nie-uniforme samestelling en waarvan die komponente maklik geïdentifiseer kan word.*

OR/*OF*

Sand and water can be easily identified. ✓/ *Sand en water kan maklik geïdentifiseer word* (2)

2.4 Filtration ✓/ *Filtrasie* (1)

[7]

QUESTION 3/*VRAAG 3*

3.1 3.1.1 The temperature at which the vapour pressure of a liquid equals the external (atmospheric) pressure. ✓✓/ *Die temperatuur waarby die dampdruk van 'n vloeistof gelyk is aan die eksterne (atmosferiese) druk* **(2 or/*of* 0)** (2)

3.1.2 Chlorine ✓/ *Chloor* (1)

3.1.3 Phosphorus ✓/ *Fosfor* (1)

3.1.4 Water ✓
Ethanol ✓/ *Etanol*
Bromine ✓/ *Broom* (3)

3.1.5 Chlorine ✓/ *Chloor* (1)

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3.2 Salt has high thermal conductivity✓. Can easily lower the freezing point of water, which prevents ice from forming. ✓(but less effective once the temperature falls below 0 to – 9°C)/ *Sout het hoë termiese geleidingsvermoë. Kan die vriespunt van water maklik verlaag, wat verhoed dat ys vorm.* (maar minder effektief sodra die temperatuur onder 0 tot – 9 °C daal) (2)

3.3 3.3.1

- As the temperature increases, the particles in the metal have more kinetic energy. ✓/ *Soos die temperatuur styg, het die deeltjies in die metaal meer kinetiese energie.*
- Leading to more vibrations of metal atoms within the line resulting in lack of stiffness compared to a cooler day. ✓/ *Wat lei tot meer vibrasies van metaalatome binne die lyn wat lei tot 'n gebrek aan styfheid in vergelyking met 'n koeler dag.* (2)

3.3.2

- Liquid nitrogen has a very low temperature, causes the metal atoms to transfer some of their kinetic energy. ✓/ *Vloeibare stikstof het 'n baie lae temperatuur, wat veroorsaak dat die metaalatome van hul kinetiese energie oordra.*
- Leading to less vibrations of metal atoms, to less expansion effect. ✓/ *Lei tot minder vibrasies van metaalatome, tot minder uitbreidingseffek.*

OR/*OF*

- As the metal atoms cool down due to decrease in temperature, causes the metal particles to have less kinetic energy. ✓/ *Soos die metaalatome afkoel as gevolg van 'n afname in temperatuur, veroorsaak dit dat die metaaldeeltjies minder kinetiese energie het.*
- Their vibrations decrease. This leads to a decrease in the distance between the atoms, resulting in a smaller overall volume for the metal. ✓/ *Hul vibrasies neem af. Dit lei tot 'n afname in die afstand tussen die atome, wat 'n kleiner algehele volume vir die metaal tot gevolg het.*

(2)

3.3.3

- If the temperature increases, the kinetic energy of particles also increases. ✓/ *As die temperatuur styg, neem die kinetiese energie van deeltjies ook toe.*
- Leading to their increased movement and expansion. Causing them to lengthen. ✓/ *Wat lei tot hul verhoogde beweging en uitsitting. Dit veroorsaak dat hulle langer word.* (2)

(If there were no gaps, the rails would expand against each other, potentially buckling or causing the track to deform)/ *(As daar geen gapings was nie, sou die spore teen mekaar uitsit, wat moontlik sou buig of veroorsaak dat die spoor vervorm.)*

3.4 3.4.1 Diffusion ✓/*Diffusie* (1)

3.4.2 Alcohol molecules, even after some metabolism, are still present in the bloodstream. / *Alkoholmolekules, selfs na 'n mate van metabolisme, is steeds in die bloedstroom teenwoordig*.

- Water is a common solvent, and alcohol diffuses readily into water. ✓/ *Water is 'n algemene oplosmiddel, en alkohol diffundeer maklik in water*
- In a bath, the increased surface area of skin exposed to water allows for greater diffusion of alcohol into the water, leading to a stronger odour. ✓/ *In 'n bad laat die groter oppervlakte van die vel wat aan water blootgestel word, groter verspreiding van alkohol in die water toe, wat lei tot 'n sterker reuk*.

OR/*OF*

The movement of atoms or molecules from an area of higher concentration (bloodstream) to an area of lower concentration (water bath) leading to a stronger odour. ✓✓/ *Die beweging van atome of molekules vanaf 'n gebied met 'n hoër konsentrasie (bloedstroom) na 'n gebied met 'n laer konsentrasie (waterbad) wat lei tot 'n sterker reuk.* (2)

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QUESTION 4/*VRAAG 4*

4.1 4.1.1 The number of protons in an atom of an element. ✓✓ / *Die aantal protone in 'n atoom van 'n element* ***(2 OR 0)*** (2)

4.1.2 Atoms of the same element having the same number of protons, but different numbers of neutrons. ✓✓ / *Atome van dieselfde element met dieselfde aantal protone, maar verskillende getalle neutrone.* (2)

4.2 4.2.1 Neutrons ✓/*Neutrone* (1)

4.2.2 Electrons ✓/*Elektrone* (1)

4.2.3 Electrons ✓/*Elektrone* (1)

4.3 4.3.1 8 ✓ (1)

4.3.2 8 ✓ (1)

4.3.3 Fluorine/*fluoor* (1)

4.3.4 10 ✓ (1)

4.3.5 9 ✓ (1)

4.4 4.4.1 Energy needed per mole to remove the first electron from an atom in the gaseous phase. ✓✓/ *Energie benodig per mol om die eerste elektron uit 'n atoom in die gasfase te verwyder* ***(2 O R 0)*** (2)

4.4.2 Li, Na and/*en* K ✓ (**all THREE correct**, 1 or 0/ ***al DRIE korrek**, 1 of 0*)

Or/*Of*

Lithium, sodium and potassium ✓/ *Litium, natrium en kalium* (**all THREE correct**, 1 or 0 ***al DRIE korrek**, 1 of 0*) (1)

4.4.3 Group 1 / I ✓/*Groep 1 / I* (1)

4.4.4 Metals ✓/*Metale*

Metal atoms have high ability to lose electrons from their outer shell when they form ions the ions are positive, because they have more protons. ✓/ *Metaalatome het 'n hoë vermoë om elektrone van hul buitenste orbitaal te verloor wanneer hulle ione vorm; die ione is positief omdat hulle meer protone het.* (2)

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QUESTION 5/*VRAAG 5*

5.1 The sharing of valence electrons between atoms to form molecules. ✓✓ / *Die deel van valenselektrone tussen atome om molekules te vorm.*

(2 or/*of* 0) (2)

5.2 5.2.1 HCl



✓✓ (2)

5.2.2 CH_4

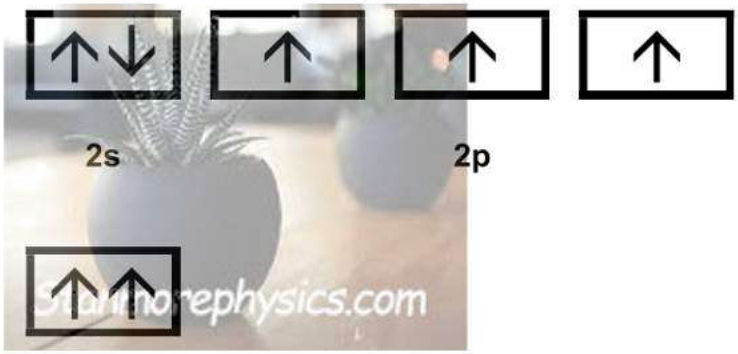


✓✓ (2)

5.3 5.3.1 $(NH_4)_2SO_4$ ✓✓ (2)

5.3.2 Covalent bond ✓/ *Kovalente binding* (1)

5.3.3 Aufbau diagram (orbital box diagram) for nitrogen/ *Aufbau-diagram (orbitaalkasdiagram) vir stikstof*



1s

n = 2	✓ (all correct/*almal korrek*)	1
n = 1	✓ (all correct/*almal korrek*)	1
	Total/*totaal*	**2**

(2)

5.3.4 5 ✓ (1)

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QUESTION 6/*VRAAG 6*

6.1 Chemical change. ✓/*Chemiese verandering*

It involves the formation of a new substance, magnesium oxide, which has different properties than the original magnesium and oxygen. ✓/ *Dit behels die vorming van 'n nuwe stof, magnesiumoksied, wat verskillende eienskappe het as die oorspronklike magnesium en suurstof.*
Or/*Of*
New chemical substances are formed. ✓/ *Nuwe chemiese stowwe word gevorm* (2)

6.2 $2Mg + O_2 \rightarrow 2MgO$

Reactants (without mole ratio) / *Reaktante (sonder molverhouding)*	✓	1
Products (without mole ratio)/ *Produkte (sonder molverhouding)*	✓	1
Balancing (mole ratio) both Reactants and Product/ *Balansering (molverhouding) van beide Reaktante en Produk*	✓	1
Total/*totaal*		**3**

(3)

6.3

Reactants/*reaktante*		**Products/*produkte***	
$2Mg + O_2$		$2MgO$	
$= 2(24) + 2(16)$ $= 80\ g.mol^{-1}$	✓ ✓	$= 2(24 + 16)$ $= 80\ g.mol^{-1}$	 ✓
	2		**1**

Thus, the mass of the reactants = mass of the products ✓/ *Dus, die massa van die reaktante = massa van die produkte* (4)

6.4 6.4.1 Chlorine + hydrogen→ hydrogen chloride / *Chloor + waterstof → waterstofchloried*

Both reactants /*beide reaktante*	✓	1
Products/*produkte*	✓	1
Total/*totaal*		**2**

(2)

6.4.2 $Al_2(CO_3)_3 \rightarrow Al_2O_3 + 3CO_2$

Reactants (without mole ratio)/ *Reaktante (sonder molverhouding)*	✓	1
Products (without mole ratio)/ *Produkte (sonder molverhouding)*	✓	1
Balancing (mole ratio) both Reactants and Product/ *Balansering (molverhouding) van beide Reaktante en Produk*	✓	1
Total/*totaal*		**3**

(3)

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QUESTION 7/*VRAAG 7*

7.1 The amount of substance having the same number of particles as there are atoms in 12 g carbon-12. ✓✓/ *Die hoeveelheid stof met dieselfde aantal deeltjies as wat daar atome in 12 g koolstof-12 is* **(2 or/*of* 0)** (2)

7.2 7.2.1 $M(Na_2CO_3) = 2(Na) + C + 3O$
$= 2(23) + (12) + 3(16)$ ✓
$= 106\ g.mol^{-1}$ ✓ (2)

Positive marking form question 7.2.1/*positiewe nasien vanaf vraag 7.2.1*

7.2.2 $n = \frac{m}{M}$ ✓

$n = \frac{10,6}{106}$ ✓

$n = 0,10\ mol$ ✓ (3)

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7.2.3 $n = \frac{V}{V_m}$ ✓

$n = \frac{4,87}{22,4}$ ✓

$n = 0,2174\ mol$ ✓ (3)

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(accept/*aanvaar* 0,22 mol/ 0,217 mol. DON'T accept/*ONAANVAARBAAR* 0,2 mol / 0,21 mol)

[10]

TOTAL: 100