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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)

NOVEMBER 2024

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 100

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These marking guidelines consists of 6 pages and the cognitive grid.
Hierdie nasienriglyne bestaan uit 6 bladsye en 'n kognitiewe rooster.

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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_4NO_3 ✓✓ (2)

2.2 2.2.1 Aluminium is a metal that is a thermal conductor./*Aluminium is a metaal wat 'n termiese geleier is.* ✓
OR/*OF*
Aluminium allows heat to pass through easily/*Aluminium laat toe dat hitte maklik deur dit gaan.* ✓ (1)

2.2.2 Plastic is a thermal insulator./*Plastiek is nie 'n termiese geleier nie.* ✓
OR/OF
Plastic does not allow heat to pass through it/*Plastiek laat nie toe dat hitte deur dit gaan nie.* ✓ (1)
[8]

QUESTION/*VRAAG* 3

3.1 Measure of the average kinetic energy of the particles./*Die gemiddelde kinetiese energie van deeltjies.* ✓✓ (2)

3.2 Thermometer/*Termometer* ✓ (1)

3.3 To distribute the heat evenly in the beaker./*Om te verseker dat die hitte eweredelik versprei word.* ✓
OR/*OF*
To keep uniform temperature throughout./*Om univormige deurgans te behou.* ✓ (1)

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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 kinetice 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) ✓
% *oorvloed van* = 0,2 ✓ (2)

4.1.3 Relative atomic mass/*Relatiewe atoommassa*
$= \frac{(99{,}76\times16)\ \checkmark + (0{,}04\times17)\ \checkmark + (0{,}2\times18)\ \checkmark}{100}$
= 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 
(4)
[17]

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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) energy per mol benodig om 'n elektron van 'n atoom in die gasfase te verwyder. ✓✓ (2 *of* 0) (2)

5.2 Ionisasion 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) elektrostatiese 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]

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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 chemise 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)] ✓=2(207+16)✓+4[14+2(16)] ✓+(2x16)✓
$2(207 + 124) = 446 + 184 + 32$
$662 = 662$ ✓ (5)

6.2.3 6,62 g – 4,46 g ✓ = 2,16 g ✓ (2)

6.3 $4\ NH_3(g) + 5\ O_2(g)$ ✓ ✂$4\ NO(g) + 6\ H_2O(\ell)$ ✓ (2)
[14]

QUESTION 7

7.1

OPTION 1		**OPTION 2**	
n(NaCℓ)	$= \frac{m}{M}$	c(NaCℓ)	$= \frac{m}{MV}$ ✓
	$= \frac{5,85}{58,5}$ ✓		$= \frac{0,1\ ✓}{58,5(0,5)\ ✓}$
	= 0,1 mol		= 0,2 mol.dm^{-3} ✓
c(NaCℓ)	$= \frac{n}{V}$ ✓		
	$= \frac{0,1}{0,5}$ ✓		
	= 0,2 mol.dm^{-3} ✓		

(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.* ✓✓
- $CuSO_4.5H_2O$ ✓ (Accept any other correct forumula/*Aanvaar enige ander korrekte formule*) (3)

7.3 $m(H_2O) = 5 – 3 = 2$ g ✓

$$\%H_2O = \frac{mass\ of\ water\ /\ massa\ water}{mass\ of\ hydrated\ salt\ /\ massa\ van\ die\ gehidriseerde\ sout} \times 100$$
$$= \frac{2}{5} \times 100$$
$$= 40\ \%\ ✓$$

(2)
[9]

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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 $M(NH_4NO_3)$ = 14 + 4(1) + 14 + 3(16) ✓
= 80 g.mol^{-1} ✓ (2)

8.3.2 $n(NH_4NO_3) = \frac{m}{M}$ ✓
$= \frac{15}{80}$ ✓
= 0,19 mol ✓ (3)

8.3.3 M(NO) = 14 + 16
= 30 g.mol^{-1} ✓
$n(NO) = \frac{m}{M}$
$= \frac{12}{30}$ ✓
= 0,4 mol
V(NO) = nV_m ✓
= (0,4)(22,4) ✓
= 8,96 dm^3 ✓ (5)

8.3.4 $N(N_2) = nN_A$ ✓
= 2(6,02 x 10^{23}) ✓ (2) ✓
= 2,41 x 10^{24} nitrogen atoms/*stikstof atome* ✓ (4)
[17]

TOTAL: 100

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