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**

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

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)

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*
                  $= \dfrac{(99,76 \times 16) ✓ + (0,04 \times 17) ✓ + (0,2 \times 18) ✓}{100}$
                  = 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
                  $Al\overset{\bullet}{\underset{\bullet}{\bullet}}$ ✓ + $\bullet\overset{\bullet\bullet}{\underset{\bullet}{N}}\bullet$ ✓ ⟶ Al^{3+} ✓ $\left[\overset{\bullet\bullet}{\underset{\bullet\bullet}{:N:}}\right]^{3-}$ ✓   (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) 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]

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 $2[207+2(14)+3(16)]$ ✓ $=2(207+16)$ ✓ $+4[14+2(16)]$ ✓ $+(2\times16)$ ✓
$2(207 + 124) = 446 + 184 + 32$
$662 = 662$ ✓   (5)

6.2.3 $6{,}62\ g - 4{,}46\ g$ ✓ $= 2{,}16\ g$ ✓   (2)

6.3 $4\ NH_3(g) + 5\ O_2(g)$ ✓ $\rightarrow 4\ NO(g) + 6\ H_2O(\ell)$ ✓   (2)

[14]

QUESTION 7

7.1

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

(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 $= \dfrac{mass\ of\ water\ /\ massa\ water}{mass\ of\ hydrated\ salt\ /\ massa\ van\ die\ gehidriseerde\ sout} \times 100$
$= \dfrac{2}{5} \times 100$
$= 40\ \%$ ✓   (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 $M(NH_4NO_3) = 14 + 4(1) + 14 + 3(16)$ ✓
= 80 g.mol^{-1} ✓   (2)

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

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

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

TOTAL: 100