education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT
PROVINSIALE ASSESSERING

GRADE/*GRAAD* 11

TECHNICAL SCIENCE P2
TEGNIESE WETENSKAPPE V2
NOVEMBER 2024
MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 75

These marking guidelines consist of 5 pages.
Hierdie nasienriglyne bestaan uit 5 bladsye.

QUESTION/*VRAAG* 1

1.1 D ✓✓ (2)

1.2 C ✓✓ (2)

1.3 B ✓✓ (2)

1.4 C ✓✓ (2)

1.5 D ✓✓ (2)
[10]

QUESTION/*VRAAG* 2

2.1 The amount of heat lost equals the amount of heat gained✓, when no heat is lost.✓
Die hoeveelheid warmte wat afgegee word is gelyk aan die hoeveelheid warmte-energie wat weer opgeneem word, mits geen warmte verlore gaan nie. (2)

2.2 The mass of an object✓/ *Die massa van 'n voorwerp*

The amount of heat (energy) produced or released✓
Die hoeveelheid hitte (energie) wat verskaf of vrygestel word.

The material/s that the object consist of. ✓
Die stof/stowwe waaruit die voorwerp bestaan. (3)

2.3.1 The amount of heat required to increase the temperature of **1 kg** of the substance by *1°C* or 1K**.** ✓✓
*Die hoeveelheid warmte-energie wat nodig is om **1kg** van die betrokke stof se temperatuur met 1°C of 1K te laat styg.* (2)

2.3.2
$$Q = mc\Delta T\checkmark$$
$$16\,800\checkmark = (1{,}1)\,\boldsymbol{c}\,(59 - 20)\,\checkmark$$
$$c = \frac{16\,800}{(39)(1{,}1)}$$
$$c = 391{,}6$$
$$c = 391{,}6\,J.kg^{-1}{}^{\circ}C^{-1}\,\checkmark$$ (4)

2.3.3 INCREASE✓✓/*VERMEERDER* (2)
[13]

QUESTION/*VRAAG* 3

3.1 The sum of the kinetic energy and potential energy of all the molecules of the system.✓✓
Die som van die kinetiese energie en die potensiële energie van al die deeltjies/molekules van die stelsel. (2)

3.2 System/ *Sisteem* 1: Isolated✓/*Geïsoleerd*
System/ *Sisteem* 2: Closed✓/*Geslote*
System/ *Sisteem* 3: Open✓/*Oop* (3)

3.3 If heat energy ∆Q is given to a system, it is used in two ways:
(i) In increasing the internal energy of the system (∆U). ✓
(ii) In doing work against external pressure (∆W). ✓
Indien warmte-energie (∆U*) aan 'n termodinamiese stelsel verskaf, word dit op ' TWEE wyses aangewend:*
(i)Verhoog die interne energie van die stelsel (∆U)
(ii) Om arbeid (∆W) teen eksterne druk te verrig.
(2)

3.4.1 $\Delta Q = Q_{in} - Q_{out/uit}$ ✓
$= 1200 - 700$✓
$= 500$ J✓ (3)

3.4.2 **(Positive marking from QUESTION 3.4.1**
***Positiewe nasien vanaf VRAAG 3.4.1*)**

$\Delta Q = \Delta U + \Delta W$✓
$500 = \Delta U + 600$✓
$\Delta U = -100$ J
$\Delta U = 100$ J decrease/ *afname*✓ (3)

3.4.3 By insulating a system well, you can reduce the amount of heat energy exchanged between the system and its surroundings. ✓
Deur 'n sisteem goed te isoleer, kan jy die hoeveelheid hitte-energie wat tussen die sisteem en sy omgewing uitgeruil word, verminder. (1)

3.5 The substance that absorbs heat from a hotter/warmer source. ✓✓
'n Stof wat hitte vanaf 'n warmer bron absorbeer. (2)

3.6
- Air ✓
- Oil ✓
- Water
- Other gases (Any relevant 2 answers)

- *Lug,*
- *olie,*
- *water*
- *Ander gasse (Enige 2 relevante antwoorde)* (2)

[18]

QUESTION/*VRAAG* 4

4.1 Oxidation is the loss of electrons.✓✓
Reduction is the gain of electrons (in redox reactions). ✓✓
Oksidasie is die verlies aan elektrone.
Reduksie is die wins aan elektrone (in redoksreaksies). (4)

4.2.1 Copper (II) ion/(Cu^{2+})✓
Koper (II) ioon (Cu^{2+}) (1)

4.2.2 Sodium ion /(Na^{+})✓
Natriumioon /(Na^{+}) (1)

4.3 A number assigned to each element in a compound to indicate the charge it would have if it were an ion. ✓✓
'*n Getal wat aan elke element in 'n verbinding toegeken word om die lading aan te dui wat dit sou hê indien dit 'n ioon was*. (2)

4.4.1 $\underline{Cr}_2O_7^{2-}$:
$2(x) + 7(-2) = -2$
$2(x) = 12$
$Cr = +6$✓ (1)

4.4.2 $Mg\underline{S}O_4$:
$+2 \quad + S + 4(-2) = 0$
$S = +6$✓ (1)

4.4.3 $H\underline{N}O_3$
$+1 \quad + N \quad + 3(-2) = 0$
$N = +5$✓ (1)

4.4.4 $K\underline{Mn}O_4$
$+1 \quad + Mn + 4(-2) = 0$
$Mn = +7$✓ (1)

4.5.1 H_2/(Hydrogen ion (H^+) ✓✓
H_2*/(Waterstofioon (*H^+*)* (2)

4.5.2 Cl_2/(Chlorine ion (Cl^-) ✓✓
Cl_2/(Chloorioon Cl_2/(Cl^-) (2)
[16]

QUESTION/*VRAAG* 5

5.1 An electrolyte is a solution that contains ions that can conduct electrical charge. ✓✓
'n Elektroliet is 'n oplossing wat ione bevat wat elektriese lading kan gelei. (2)

5.2 A non-spontaneous reaction requires an external source of energy (such as a cell or battery) to occur. ✓✓
'n Nie-spontane reaksie benodig 'n eksterne bron van energie (soos 'n sel of battery), om plaas te vind. (2)

5.3
- Carbon is unreactive (does not react with copper(II)chloride).✓
- Carbon conducts electricity.✓

- *Koolstof is onreaktief (reageer nie met koper(II)chloried nie).*
- *Koolstof gelei elektrisiteit.* (2)

5.4.1 A✓ (1)

5.4.2 B✓ (1)

5.5.1 Chlorine gas will form.✓✓/*Chloorgas vorm.* (2)

5.5.2 Copper ions form a precipitant on the electrode.✓✓
Koperione vorm 'n neerslag op die elektrode. (2)

5.6.1 $Cu^{2+} + 2e^- \rightarrow Cu$✓✓ (2)

5.6.2 $2Cl^- \rightarrow Cl_2 + 2e^-$✓✓ (2)

5.7
- Plating of jewellery (with silver or gold). ✓
- Prevent rusting (zinc plates has an iron core and is covered with a layer of zinc). ✓
- Prevent iron from reacting with food (tins have an iron core and is covered with tin). ✓
- To purify metals (from ores or other compounds).✓
  (Any two)
- *Platering van juwele (met silwer of goud).*
- *Om roes te voorkom (sinkplate bestaan uit 'n ysterkern wat met 'n lagie sink bedek is).*
- *Om te voorkom dat yster met die kos reageer (blikkies van blikkieskos bestaan uit yster wat met 'n lagie tin bedek is*
- *Om metale te reinig (van ander verbindings of erts).*
  (*Enige 2)* (2)

[18]

TOTAL/*TOTAAL*: 75