



education

Department of
Education
FREE STATE PROVINCE

GRADE 10 / *GRAAD 10*
PROVINCIAL FORMAL ASSESSMENT TASK
PROVINSIALE FORMELE ASSESSERINGSTAAK

SEPTEMBER 2016 / *SEPTEMBER 2016*

MEMORANDUM

PHYSICAL SCIENCES / *FISIESE WETENSKAPPE*
TEST / *TOETS*
(PHYSICS AND CHEMISTRY) / (*FISIKA EN CHEMIE*)

TIME: 2 HOURS

TYD: 2 UUR

MARKS: 100

PUNTE: 100

This memorandum consists of 6 pages.
Hierdie memorandum bestaan uit 6 bladsye.

QUESTION 1/VRAAG 1

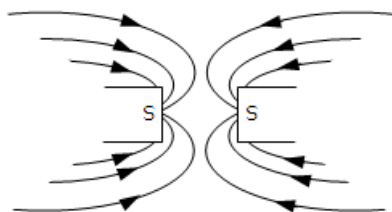
- 1.1 C ✓✓ (2)
- 1.2 C ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 D ✓✓ (2)
- 1.5 B ✓✓ (2)
- 1.6 A ✓✓ (2)
- 1.7 B ✓✓ (2)
- 1.8 C ✓✓ (2)
- 1.9 C ✓✓ (2)
- 1.10 B ✓✓ (2)

[20]**QUESTION 2/VRAAG 2**

- 2.1 A region in space where a magnetic (or ferromagnetic) material experiences a (non-contact/magnetic) force. ✓✓
'n Gebied in die ruimte waar 'n magnetiese (of ferromagnetiese) materiaal 'n (nie-kontak/magnetiese) krag ondervind. (2)
- 2.2 **ANY TWO/ENIGE TWEE:**
Iron ✓ / Nickel ✓ / Cobalt / Fe / Ni / Co / alloys of these metals
Yster / Nikkel / Kobalt / Fe / Ni / Co / allooië van hierdie metale (2)

2.3

2.3.1

**Marking criteria/Nasienriglyne:**

- Correct shape./Korrekte vorm. ✓
- Correct direction./Korrekte rigting. ✓
- Field lines do not touch/cross each other. ✓
Veldlyne raak nie aan/sny nie mekaar nie.

(3)

- 2.3.2 (Magnetic field) lines further apart / Lines less dense. ✓
(Magneetveld) lyne verder uitmekaar./Lyne minder dig.

(1)

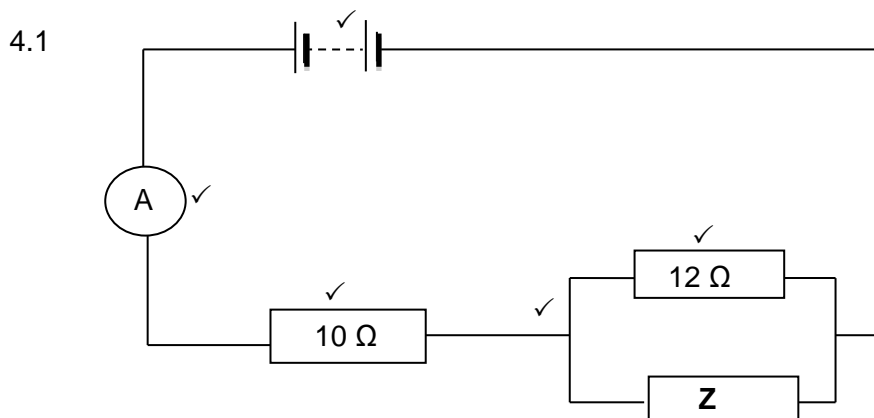
[8]

QUESTION 3/VRAAG 3

3.1 The spheres are having the similar charge/like charges ✓ and repel each other. ✓
Die sfere het soortgelyke/gelyke ladings en stoot mekaar af. (2)

3.2 $Q = \frac{4,5 \times 10^{-9} + (-2,8 \times 10^{-9})}{2} \checkmark = + 8,5 \times 10^{-10} \text{ C } \checkmark$ (2)

3.3 $\Delta Q_B = Q_B(\text{final}) - Q_B(\text{initial}) \checkmark$
 $= 8,5 \times 10^{-10} - 4,5 \times 10^{-9} \checkmark$
 $= - 3,65 \times 10^{-9} \text{ C } \checkmark$ (3)
[7]

QUESTION 4/VRAAG 4

Marking criteria/Nasienriglyne	
Symbol for a battery as shown OR two or more cells in series. <i>Simbool van battery soos getoon OF twee of meer selle in serie.</i>	✓
Correct symbol for an ammeter connected in series and measuring main current. <i>Korrekte simbool vir ammeter in serie en wat hoofstroom meet.</i>	✓
10 Ω resistor in connected in series ammeter and battery. <i>10 Ω-resistor in serie geskakel aan ammeter en battery.</i>	✓
12 Ω resistor & Z connected in parallel./12 Ω-resistor & Z in parallel geskakel.	✓
Parallel resistors in series with 10 Ω resistor./Parallele resistors in serie met 10 Ω-resistor	✓

(5)

4.2 Electric current is the rate of flow of charge. ✓✓
Elektriese stroom is die tempo van vloei van ladings. (2)

4.3 Positive/Positief ✓ (1)

4.4 Ammeters connected in series in a circuit ✓ and therefore the positive terminal of the battery should be connected to the negative terminal of the ammeter. ✓
Ammeters word in serie geskakel en dus moet die positiewe terminal van die battery aan die negatiewe terminal van die ammeter geskakel word. (2)

4.5

4.5.1 $\frac{1}{R_T} = \frac{1}{R_{12}} + \frac{1}{R_Z} \checkmark$
 $\frac{1}{8} = \frac{1}{12} + \frac{1}{Z} \checkmark$

$Z = 24 \Omega \checkmark$

(4)

$$4.5.2 \quad I = \frac{Q}{Dt} \checkmark$$

$$1,5 = \frac{Q}{60} \checkmark$$

$$Q = 90 \text{ C} \checkmark$$

Note/Let wel:

Ohm's law is not in the Gr 10 curriculum.
Ohm se wet is nie in die Gr 10 kurrikulum nie.

(4)

4.5.3 **POSITIVE MARKING FROM QUESTION 4.5.2.**
POSITIEWE NASIEN VAN VRAAG 4.5.2.

$$V = \frac{W}{Q} \checkmark$$

$$9 = \frac{W}{90} \checkmark$$

$$W = 810 \text{ J} \checkmark$$

(3)

4.6 Some of the energy is lost as heat (energy). / Van die energie gaan as hitte verlore.

(1)
[22]**QUESTION 5/VRAAG 5**

5.1 No free (mobile) ions OR Circuit not complete/ *Geen vrye (mobiele) ione nie OF Stroombaan nie voltooi.*

(1)

5.2

5.2.1 A solution that conducts electricity through the movement of ions. $\checkmark\checkmark$
'n Oplossing wat elektrisiteit gelei deur die beweging van ione.

(2)

5.2.2 NH_4^+ \checkmark and/en NO_3^- \checkmark

(2)

5.2.3

Marking criteria/Nasienglyne

- Any formula/Enige formule: $c = \frac{n}{V}$ or/of $c = \frac{m}{MV}$ \checkmark
- Substitute/Vervang $80 \text{ g} \cdot \text{mol}^{-1}$ \checkmark
- Substitute/Vervang $250 \times 10^{-3} \text{ dm}^3/0,25 \text{ dm}^3$ \checkmark
- Final answer/Finale antwoord: $0,75 \text{ mol} \cdot \text{dm}^{-3}$ \checkmark

OPTION 1/OPSIE 1

$$n(\text{NH}_4\text{NO}_3) = \frac{m}{M}$$

$$= \frac{15}{80} \checkmark$$

$$= 0,19 \text{ mol}$$

$$c(\text{NH}_4\text{NO}_3) = \frac{n}{V} \checkmark$$

$$= \frac{0,19}{250 \times 10^{-3}} \checkmark$$

$$= 0,75 \text{ mol} \cdot \text{dm}^{-3} \checkmark$$

Range/Gebied: $0,75 - 0,76 \text{ mol} \cdot \text{dm}^{-3}$ **OPTION 2/OPSIE 2**

$$c(\text{NH}_4\text{NO}_3) = \frac{m}{MV} \checkmark$$

$$= \frac{15}{(80)(250 \times 10^{-3})} \checkmark$$

$$= 0,75 \text{ mol} \cdot \text{dm}^{-3} \checkmark$$

(4)
[9]

QUESTION 6/VRAAG 6

6.1

6.1.1 Standard temperature and pressure ✓
Standaard temperatuur en druk (1)

6.1.2 $n(\text{Zn}) = \frac{m}{M}$ ✓ (OR/OF use a ratio/gebruik verhouding)
 $= \frac{1,5}{65}$ ✓
 $= 0,02 \text{ mol}$ ✓ (3)

6.1.3 **POSITIVE MARKING FROM QUESTION 6.1.2.**
POSITIEWE NASIEN VAN VRAAG 6.1.2.

$n(\text{H}_2) = \frac{V}{V_m}$ ✓ (OR/OF use a ratio/gebruik verhouding)
 $0,02 = \frac{V}{22,4}$ ✓
 $\therefore V = 0,45 \text{ dm}^3$ ✓ (Range/Gebied: 0,45 – 0,52 dm³) (3)

6.1.4 **POSITIVE MARKING FROM QUESTION 6.1.2.**
POSITIEWE NASIEN VANAF VRAAG 6.1.2.

$n(\text{Cl}) = \frac{N}{N_A}$ ✓ (OR/OF use a ratio/gebruik verhouding)
 $\frac{2(0,02)}{6,02 \times 10^{23}}$ ✓
 $\therefore N = 2,41 \times 10^{22}$ ✓ (Range/Gebied: 2,41 x 10²² – 2,77 X 10²³) (4)

6.2 $M(\text{Na}_2\text{CO}_3) = 106 \text{ g} \cdot \text{mol}^{-1}$ ✓
 $M(\text{xH}_2\text{O}) = \underline{268} - 106$ ✓ = 162 (g·mol⁻¹)
 $x = n(\text{H}_2\text{O}) = \frac{162}{18}$ ✓ = 9 (mol) ✓ (4)

6.3

6.3.1 The simplest whole-number ratio of atoms in the compound. ✓✓
Die eenvoudigste heelgetalverhouding van atome in die verbinding. (2)

6.3.2 In 100 g of compound : 71,66 g Cl; 24,27 g C and/en 4,07 g H

$n(\text{Cl}) = \frac{71,66}{35,5}$ ✓ = 2,02 mol

$n(\text{C}) = \frac{24,27}{12}$ ✓ = 2,02 mol

$n(\text{H}) = \frac{4,07}{1}$ ✓ = 4,07 mol

Whole number ratio/Heelgetal verhouding:

$\frac{2,02}{2,02} : \frac{2,02}{2,02} : \frac{4,07}{2,02}$ ✓

C : H : Cl = 1 : 2 : 1 ✓

Empirical formula/Empiriese formule: CH₂Cl ✓

(6)
[23]

QUESTION 7/VRAAG 7

7.1 Silver nitrate/*Silwernitraat* ✓ (1)

7.2 X: Potassium chloride / *Kaliumchloried* ✓✓
Y: Potassium iodide / *Kaliumjodied* ✓✓
Z: Potassium bromide / *Kaliumbromied* ✓✓ (6)

7.3 Br ✓ (1)

7.4 $\text{AgNO}_3 + \text{KCl} \checkmark \rightarrow \text{KNO}_3 + \text{AgCl} \checkmark$ Bal. ✓

Marking criteria/Nasienriglyne:

✓ reactants	✓ products	✓ balancing
reaktanse	produkte	balansering

(3)
[11]

GRAND TOTAL/GROOTTOTAAL: 100