



education

Department of
Education
FREE STATE PROVINCE

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GRADE 10/*GRAAD 10*

**PROVINCIAL FORMAL/*PROVINSIALE FORMELE*
ASSESSMENT TASK/*ASSESSERINGSTAAK***

SEPTEMBER 2015

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

MARKS: 100/*PUNTE: 100*

MEMORANDUM

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

QUESTION 1 / VRAAG 1

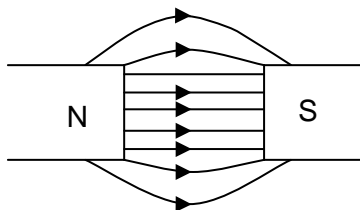
- 1.1 B ✓✓ (2)
- 1.2 D ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 C ✓✓ (2)
- 1.5 C ✓✓ (2)
- 1.6 A ✓✓ (2)
- 1.7 D ✓✓ (2)
- 1.8 D ✓✓ (2)
- 1.9 B ✓✓ (2)
- 1.10 C ✓✓ (2)
- [20]**

QUESTION 2

- 2.1 A region in the space in which a magnet / ferromagnetic substance experiences a (non-contact force). ✓✓
'n Gebied in die ruimte waarin 'n magneet/ferromagnetiese stof 'n (nie-kontak)krag ondervind. (2)

- 2.2 Attract / Aantrek ✓ (1)

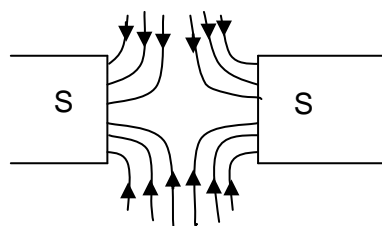
2.3



Field lines drawn as shown./Veldlyne getreken soos aangetoon. ✓
Direction of field lines from N to S pole between magnets./Rigting van veldlyne vanaf N na S-pool tussen magnete. ✓

(2)

2.4



Field lines drawn as shown./Veldlyne getreken soos aangetoon. ✓
Direction of field lines towards S poles between magnets./Rigting van veldlyne na S-pole tussen magnete. ✓

(2)
[7]

QUESTION 3/VRAAG 3

The exam guidelines has a different definition.

- 3.1 Charge cannot be created or destroyed, ✓
but only transferred from one object to another. ✓
Ladings kan nie geskep of vernietig word nie,
maar slegs oorgedra word van een voorwerp na 'n ander. (2)

- 3.2 P to/na Q ✓ (1)

- 3.3 New charge = $\frac{P + Q}{2}$
= $\frac{-12 \times 10^{-6} + 4 \times 10^{-6}}{2}$ ✓
= $-4 \times 10^{-6} \text{ C}$ (3)

- 3.4
- | <u>OPTION 1/OPSIE 1</u> | <u>OPTION 2/ OPSIE 2</u> |
|---|--|
| $\Delta Q_P = Q_f - Q_i$
$= -4 \times 10^{-6} \checkmark - (-12 \times 10^{-6}) \checkmark$
$= 8 \times 10^{-6} \text{ C} \checkmark$ | $\Delta Q_Q = Q_f - Q_i$
$= -4 \times 10^{-6} \checkmark - (4 \times 10^{-6}) \checkmark$
$= -8 \times 10^{-6} \text{ C} \checkmark$ |
- (3)

- 3.5 **POSITIVE MARKING FROM QUESTION 3.4.**
POSITIEWE NASIEN VAN VRAAG 3.4.

<u>OPTION 2/ OPSIE 2</u>	<u>OPTION 2/ OPSIE 2</u>
$Q_Q = nq$ $8 \times 10^{-6} = n(-1,6 \times 10^{-19}) \checkmark$ $n = 5 \times 10^{13} \text{ electrons} \checkmark$	$Q_P = nq$ $-8 \times 10^{-6} = n(1,6 \times 10^{-19}) \checkmark$ $n = 5 \times 10^{13} \text{ electrons} \checkmark$

(2)
[11]

QUESTION 4/VRAAG 4

- 4.1 Potential difference / *Potensiaalverskil* ✓ (1)

- 4.2 The ratio of the potential difference across a resistor to the current in the resistor.
Die verhouding ✓ van die potensiaalverskil oor 'n weerstand tot die stroom in die weerstand. ✓ (2)

- 4.3
- 4.3.1 $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓
 $\frac{1}{R_p} = \frac{1}{24} + \frac{1}{8}$ ✓
 $\therefore R_p = 6 \Omega$ ✓ (3)

- 4.3.2 **POSITIVE MARKING FROM QUESTION 4.3.1.**
POSITIEWE NASIEN VAN VRAAG 4.3.1.

$R_t = \underline{2} + 6 \checkmark = 8 \Omega \checkmark$ (2)

4.4 18 V ✓ (1)

4.5

4.5.1 A coulomb the charge transferred in a conductor in one second ✓
if the current is one ampere. ✓
*'n Coulomb is die lading oorgedra in 'n geleier in een sekonde
wanneer die stroom een ampere is.* (2)

4.5.2 $I = \frac{Q}{\Delta t}$ ✓
 $= \frac{18}{6}$ ✓
 $= 3 \text{ A}$ ✓ (3)

4.5.3 Ratio of resistances: 24 : 8 = 3 : 1

24 Ω: $\frac{1}{4} \times 3$ ✓ = 0,75 A ✓

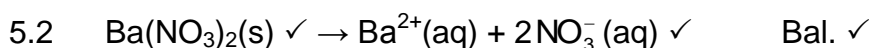
OR/OF

8 Ω: $\frac{3}{4} \times 3$ ✓ = 2,25 A

24 Ω: 3 – 2,25 = 0,75 A ✓ (2)
[16]

QUESTION 5/VRAAG 5

5.1 The process in which solid ionic crystals are broken up into ions ✓
when dissolved in water. ✓
*Die proses waardeur ioniese vaste stowwe opgebreek word in ione
wanneer dit in water oplos.* (2)



Notes/Aantekeninge

- | | | |
|--|------------------------|----------------------------|
| • Reactants ✓
Reaktanse | Products ✓
Produkte | Balancing ✓
Balansering |
| • Ignore/Ignoreer ⇌ and phases / en fase | | |
| • Marking rule 3.10 and 3.5. / Nasienreël 3.10 en 3.5. | | |

(3)

5.3 Consists of free moving ions. / Bestaan uit vrybewegende ione. ✓

OR/OF

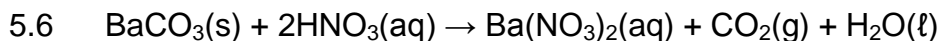
Conducts electricity. / Gelei elektrisiteit. ✓ (1)

5.4

5.4.1 KCl ✓✓ (2)

5.4.2 K_2CO_3 ✓✓ (2)

5.5 Silver chloride / silwerchloried ✓ (1)



Marking criteria/Nasienriglyne

Formulae of reactants correct./Formules van reaktanse korrek. ✓

Formulae of products correct./Formules van produkte korrek. ✓

Correct balancing./Korrekte balansering. ✓

All phases correctly indicated./Alle fases korrek aangedui. ✓

(4)
[15]

QUESTION 6/VRAAG 6

6.1 The amount of substance ✓ with the same number of particles as there are atoms in 12 g carbon-12. ✓

Die stofhoeveelheid met dieselfde getal deeltjies as wat daar atome in 12 g koolstof-12 is.

(2)

6.2

6.2.1 $n(\text{O}_2) = \frac{m}{M}$ ✓

$$= \frac{0,76}{32} \quad \checkmark$$

$$= 0,02 \text{ mol} \quad \checkmark \quad (0,024 \text{ mol})$$

(3)

6.2.2 $n(\text{H}_2) = \frac{m}{M}$

$$= \frac{0,63}{2} \quad \checkmark$$

$$= 0,32 \text{ mol} \quad \checkmark$$

(2)

6.3 From balanced equation/*Van gebalanseerde vergelyking:*

1 mol O_2 reacts with/*reageer met* 2 mol H_2 . ✓

0,02 mol O_2 needs/*benodig* 0,04 mol H_2 . ✓

H_2 in excess/*oormaat* ✓

O_2 is the limiting reagent./ *O_2 is die beperkende reagens.* ✓

OR/OF

Needed ratio/*Benodigde verhouding:* $\frac{\text{H}_2}{\text{O}_2} = \frac{2}{1}$ ✓

Actual ratio / *werklike verhouding:* $\frac{\text{H}_2}{\text{O}_2} = \frac{0,32}{0,02}$ ✓ = 16 ≠ 2 ✓

O_2 is the limiting reagent./ *O_2 is die beperkende reagens.* ✓

(4)

6.4 Unreactive / non-toxic ✓

(1)
[12]

QUESTION 7/VRAAG 7

7.1

$$7.1.1 \quad n(\text{Zn}) = \frac{m}{M}$$

$$= \frac{3,5}{65} \checkmark$$

$$= 0,05 \text{ mol}$$

$$n(\text{H}_2) = n(\text{Zn}) = 0,05 \text{ mol} \checkmark$$

$$n(\text{H}_2) = \frac{V}{V_m}$$

$$0,05 = \frac{V}{22,4} \checkmark$$

$$\therefore V = 1,21 \text{ dm}^3 \checkmark$$

(Accept range/Aanvaar gebied: 1,12 to/tot 1,21 dm³)

(4)

7.1.2 **POSITIVE MARKING FROM QUESTION 7.1.1.**

POSITIEWE NASIEN VAN VRAAG 7.1.1.

$$n(\text{HCl}) = 2n(\text{Zn}) = 0,1 \text{ mol} \checkmark \quad (0,11 \text{ mol})$$

$$c(\text{HCl}) = \frac{n}{V}$$

$$\therefore 0,2 = \frac{0,1}{V} \checkmark$$

$$\therefore V = 0,5 \text{ dm}^3 \checkmark$$

(Accept range/Aanvaar gebied: 0,5 to/tot 0,54 dm³)

(3)

7.1.3 **POSITIVE MARKING FROM QUESTION 7.1.1.**

POSITIEWE NASIEN VAN VRAAG 7.1.1.

$$n(\text{Cl}^- \text{ ions/ione}) = 2n(\text{ZnCl}_2) = 2n(\text{Zn}) = 0,1 \text{ mol} \checkmark \quad (0,11 \text{ mol})$$

$$N(\text{Cl}^- \text{ ions/ione}) = nN_A$$

$$= (0,1)(6,02 \times 10^{23}) \checkmark$$

$$= 6,02 \times 10^{22} \checkmark$$

(Accept range/Aanvaar gebied: $6,02 \times 10^{22}$ to/tot $6,48 \times 10^{22}$)

(3)

7.2

7.2.1 Water of crystallization / *Kristalwater* \checkmark

(1)

$$7.2.2 \quad \% \text{Cu} = \frac{63,5}{249,5} \checkmark$$

$$= 25,45\% \checkmark$$

(3)

$$7.3 \quad n(\text{Ca}) = \frac{m}{M} = \frac{29,4}{40} = 0,735 \text{ mol} \checkmark$$

$$n(\text{S}) = \frac{m}{M} = \frac{23,5}{32} = 0,734 \text{ mol} \checkmark$$

$$n(\text{O}) = \frac{m}{M} = \frac{47,1}{16} = 2,944 \text{ mol} \checkmark$$

$$(\text{Ca}) : n(\text{S}) : n(\text{O}) = 0,735 : 0,734 : 2,944 = 1:1:4 \checkmark$$

Empirical formula/*Empiriese formule*: $\text{CaSO}_4 \checkmark$

(5)

[19]

GRAND TOTAL/GROOTTOTAAL: 100