GRADE 10 / *GRAAD 10*

PROVINCIAL CONTROL TEST
P*ROVINSIALE KONTROLETOETS*

SEPTMEBER 2018

MEMORANDUM

PHYSICAL SCIENCES
FISIESE WETENSKAPPE

TIME: 2 hours   *TYD: 2 ure*

MARKS: 100   *PUNTE: 100*

This memorandum consists of SIX pages.
Hierdie memorandum bestaan uit SES bladsye.

QUESTION 1 / *VRAAG 1*

1.1　C ✓✓

1.2　D ✓✓

1.3　B ✓✓ No answer

1.4　B ✓✓

1.5　~~B~~ ✓✓ C

1.6　D ✓✓

1.7　C ✓✓

1.8　B ✓✓ This question needs discussion.

1.9　A ✓✓

1.10　B ✓✓

[20]

QUESTION 2 / *VRAAG 2*

2.1.1　The potential difference across the ends of a conductor is the energy
transferred per unit electric charge flowing through it. ✓✓ / *Die potensiaal-
verskil oor die ente van 'n geleier is die energie oorgedra per eenheidslading wat
daardeur vloei.* (2)

2.1.2　$V = \frac{W}{Q}$ ✓ $= \frac{2000}{2}$ ✓ $= 1000 \text{ V}$ ✓ (3)

2.1.3　$Q = I \Delta t$　　　✓
　　　2 = I (2 min)
　　　2 = I (120 s) ✓
　　　I = 0,017 (0,02) A ✓
(3)

2.2.1　$R_{p} = \frac{1}{3} + \frac{1}{4}$ ✓
　　　$= \frac{12}{7}$
　　　$= 1,71 \, \Omega$ ✓

　　　$R_{T} = 1,71 + 5$ ✓
　　　　$= 6,71 \, \Omega$ ✓ (4)

2.2.2　1,5 X 4 = 6V ✓✓ (2)

2.2.3 $R_T = \frac{V_T}{I_T}$ ✓

$6{,}71 = \frac{6}{I}$ ✓

$I = 0{,}89\,A$

$R = \frac{V}{I}$

$5 = \frac{V}{0{,}89}$ ✓

$V = 4{,}47\,V$ ✓   (4)

2.2.4 $Q = It$ ✓

$= 2\,X\,3$ ✓

$= 6\,C$

$V = \frac{W}{Q}$ ✓

$4{,}47 = \frac{W}{6}$ ✓

$W = 26{,}82\,J$ ✓   (5)

CORRECTIONS GRADE 10

1.5 **C** not B.

2.2.4 $Q = It$ ✓ $= 2\times3$ ✓ $= 6C$

$V = I \times R$

$= 2 \times 5 = 10V$ ✓   (not 4,47V)

$V = \frac{W}{Q}$ ✓

$10 = \frac{W}{6}$ (not 26,82W)
     (5)

$W = 60$ **W** ✓

2.2.5 Increases / *verhoog* ✓
If all bulbs are connected in parallel:
-   the total resistance decreases and current will increase. ✓ /
As alle gloeilampe parallel geskakel word:
-   - sal die totale weerstand verminder en die stroom sal toeneem.

OR / OF

-   $R \propto \frac{1}{I}$ (2)

[25]

QUESTION 3 / *VRAAG* 3

3.1   What is the relationship between the potential difference across three
identical resistors and the way in which they are connected in a circuit? ✓✓/
*Wat is die verhouding tussen die potensiaalverskil oor drie identiese weerstande
en die manier waarop hulle in 'n stroombaan geskakel word?*   (2)

Criteria for investigative *QUESTION / Kriteria vir die ondersoekende VRAAG*
The dependent and independent variables are stated. ✓   *Die afhanklike en onafhanklike veranderlikes word gestel.*
A question is asked about the relationship between the above-mentioned variables. ✓   *'n Vraag word gevra oor die verhouding tussen bogenoemde veranderlikes.*

3.2.1   Number of resistors / *Aantal resistors* ✓   (1)

3.2.2   Potential difference / *Potensiaalverskil* ✓   (1)

3.2.3   Connected resistors in series or parallel ✓ /*Resistors in serie of parallel geskakel.*(1)

3.3   From positive terminal to negative terminal ✓/ *Van positiewe terminaal na
negatiewe terminale*   (1)

3.4.1   1,4 V ✓ (1)

3.4.2   1,4 V ✓ (1)

3.4.3.   4,2 V ✓ (1)

3.5.1   1,4 V ✓ (1)

3.5.2   4,2 V ✓ (1)

3.6   potential dividers ✓✓/ *potensiaalverdelers* (1)
[12]

QUESTION 4 */ VRAAG* 4

4.1   Distance is the total path length travelled. ✓ / *Afstand is die totale padlengte wat afgelê word.*

(1)

4.2.1   200 m ✓ (1)

4.2.2   0 m ✓ (1)

4.2.3   average speed / *gemiddelde spoed* $= \frac{\text{distance} / afstand}{\text{time} / tyd})$ ✓

$$= \frac{200}{60} \checkmark$$

$= 3,33 \text{ m·s}^{-1}$ ✓ (3)

4.3.1   **LEFT AS POSITIVE /** *LINKS AS POSITIEF*
Displacement / *Verplasing* $= -50 \text{ m} + 100 \text{ m}$ ✓
$= 50 \text{ m}$
$= 50 \text{ m}$ ✓ left / *links* ✓

OR / *OF*

RIGHT AS POSITIVE / *REGS AS POSITIEF*
Displacement / *Verplasing* $= 50 + (-100)$ ✓
$= -50$
$= 50 \text{ m}$ ✓ left / *links* ✓ (3)

4.3.2   50 m East / *Oos (25 mm)*
100 m West / *Wes (50 mm)*
50 m West / *Wes (25 mm)*

Criteria for diagram / *Kriteria vir diagram*	Marks
First vector according to scale with arrow head *Eerste vektor volgens skaal met pylkop*	✓
Second vector according to scale, starting at first one's tail *Tweede vektor volgens skaal, begin by die eerste een se stert*	✓
Resultant from first tail to last head / *Resultaat van eerste stert tot laaste kop*	✓
Resultant indicated as 50 m West / *Resultaat aangedui as 50 m Wes*	✓

(4)

4.4.1 Average velocity is the rate of change of position. ✓✓ / *Gemiddelde snelheid*
is die tempo van verandering van posisie. (2)

4.4.2 average velocity / *gemiddelde snelheid* = $\Delta x/\Delta t$ ✓
= 50 / 90 ✓
= 0,56 m·s⁻¹ ✓ east / *oos* ✓ (4)

4.4.3 100 m(✓) east / *oos* ✓ (2)
[21]

QUESTION 5 / *VRAAG 5*

5.1.1 $v_f = v_i + a\,\Delta t$ ✓
= 0 ✓ + (1)(120) ✓
= 120 m·s⁻¹ ✓ east ✓ / *oos* (5)

5.1.2

OPTION 1 / *OPSIE* 1:	OPTION 2 / *OPSIE* 2:
$\Delta x = v_i\Delta t + \frac{1}{2}a\Delta t^2$ ✓ = (0)(120) ✓ + ½(1)(120)² ✓ = 7200 m ✓ east ✓ / *oos*	$v_f^2 = v_i^2 + 2a\Delta x$ ✓ (120)² ✓ = 0 + 2(1)Δx ✓ Δx = 7200 m ✓ east ✓ / *oos*
OPTION 3 / *OPSIE* 3: $\Delta x = \left(\dfrac{v_f + v_i}{2}\right)\Delta t$ ✓ $\Delta x = \left(\dfrac{120 + 0}{2}\right)120$ ✓✓ = 7200 m ✓ east ✓ / *oos*	

(5)

5.2.1 Uniform(Constant) acceleration ✓ for 2 seconds from 0 to 40 m·s⁻¹ ✓
Uniforme (konstante) versnelling vir 2 sekondes vanaf 0 tot 40 m·s⁻¹
(2)

5.2.2 Uniform (constant) velocity ✓ of 40 m·s⁻¹ for 2 seconds ✓
Uniform (konstante) snelheid ✓ van 40 m·s⁻¹ vir 2 sekondes ✓ (2)

5.2.3 $v_f = v_i + a\,\Delta t$ ✓
10 ✓ = 40 + a (2) ✓
a = -15 m·s⁻² ✓ ~~north ✓ / *noord*~~ (5)

5.3 40 m·s⁻¹ = 40 x 10⁻³ km x $\frac{1}{60\,x\,60}$ h⁻¹
= 144 km.h⁻¹ ✓✓

The driver will receive a penalty. ✓ / *Die bestuurder sal 'n boete ontvang.* (3)
[22]
GRAND TOTAL/ GROOTTOTAAL: 100