



education

Department of
Education
FREE STATE PROVINCE

CONTROL TEST / *KONTROLETOETS*

GRADE 10 / *GRAAD 10*

**TECHNICAL SCIENCES
*TEGNIJSE WETENSKAPPE***

MEMORANDUM

MARCH 2020 / *MAART 2020*

MARKS: 75 / *PUNTE: 75*

TIME: 1½ HOURS / *TYD: 1½ UUR*

**This memorandum consists of FIVE pages.
*Hierdie memorandum bestaan uit VYF bladsye.***

QUESTION 1 / VRAAG 1

- 1.1 C ✓ (1)
1.2 E ✓ (1)
1.3 A ✓ (1)
[3]

QUESTION 2 / VRAAG 2

- 2.1 A ✓✓ (2)
2.2 C ✓✓ (2)
2.3 D ✓✓ (2)
2.4 B ✓✓ (2)
[8]

QUESTION 3 / VRAAG 3

- 3.1.1 40 (dm) OR/OF 4×10^1 (dm) ✓✓ (2)
3.1.2 0,0000032 (m) OR/OF $3,2 \times 10^{-6}$ (m) ✓✓ (2)
3.1.3 0,2 (ℓ) OR/OF 2×10^{-1} (ℓ) ✓✓ (2)
3.2.1 335 000 ✓✓ (2)
3.2.2 0,000129 ✓✓ (2)
3.3 $\Delta y = \frac{v_f^2 - v_i^2}{2g}$ ✓✓
 - One mark for correct numerator / Een punt vir korrekte teller
 - One mark for correct denominator / Een punt vir korrekte noemer
 - If Δy is not show as subject, max 1/2. / As Δy nie as onderwerp gewys is nie, maks. 1/2.

(2)
[12]

QUESTION 4 / VRAAG 4

4.1 $18 \div 60 \checkmark = 0,3 \text{ (rps)} \checkmark$ (2)

4.2 **POSITIVE MARKING FROM 4.1. / POSITIEWE NASIEN VANAF 4.1.**

$$\begin{aligned} \text{speed} &= 2\pi r\omega / \text{spoed} = 2\pi r\omega \\ &= 2\pi \times \left[\frac{1}{2} \times 0,63 \right] \checkmark \times 0,3 \checkmark \\ &= 0,59 \text{ m} \cdot \text{s}^{-1} \checkmark \end{aligned} \quad (3)$$

4.3

Substitution done in mm^3
Instelling gedoen in mm^3

$$\begin{aligned} \text{Rate} &= \frac{\text{Volume}}{\text{time}} \checkmark \\ 1,4 \times 10^3 \checkmark &= \frac{5,4 \times 10^7}{t} \checkmark \\ t &= 642,86 \text{ minutes} \checkmark \end{aligned}$$

Substitution done in m^3
Instelling gedoen in m^3

$$\begin{aligned} \text{Rate} &= \frac{\text{Volume}}{\text{time}} \checkmark \\ 1,4 \times 10^{-6} \checkmark &= \frac{5,4 \times 10^{-2}}{t} \checkmark \\ t &= 642,86 \text{ minutes} \checkmark \end{aligned} \quad (4)$$

[9]

QUESTION 5 / VRAAG 5

5.1.1 A \checkmark (1)

5.1.2 **IGNORE NEGATIVE MARKING FROM 5.1.1.**
IGNOREER NEGATIEWE NASIEN VANAF 5.1.1.

A scalar has magnitude only **OR** John's motion does not have direction. \checkmark
*'n Skalaar het slegs grootte **OF** John se beweging het nie rigting nie.* (1)

5.1.3 Any two $\checkmark\checkmark$ of time, work, distance, mass, speed, etc.
Enige twee van tyd, arbeid, afstand, massa, spoed, ens. (2)

5.2.1 The single vector which can produce the same effect as two or more vectors together. $\checkmark\checkmark$

Die enkele vektor wat dieselfde effek het as twee or meer vektore saam. (2)

5.2.2

Left/Links +

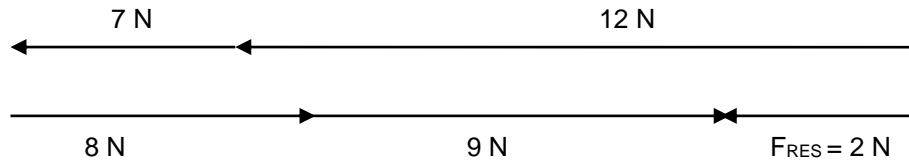
$$\begin{aligned} F_{\text{resultant}} &= \underline{12 + 7} \checkmark - \underline{8 - 9} \checkmark \\ &= 2 \text{ N to the left / na links} \checkmark \end{aligned}$$

Right/Regs +

$$\begin{aligned} F_{\text{resultant}} &= \underline{-12 - 7} \checkmark + \underline{8 + 9} \checkmark \\ &= -2 \text{ N} \\ &= 2 \text{ N to the left / na links} \checkmark \end{aligned}$$

(3)

5.2.3



MARKING CRITERIA / NASIENRIGLYNE	
Two arrows to the right / Twee pyle na regs	✓
Two arrows to the left / Twee pyle na links	✓
Dimensions of arrows are correct according to the scale; 6 cm, 3,5 cm, 4 cm & 4,5 cm for 12 N, 7 N, 8 N & 9 N respectively. <i>Pyle se afmetings is korrek volgens die skaal; 6 cm, 3,5 cm, 4 cm & 4,5 cm vir onderskeidelik 12 N, 7 N, 8 N & 9 N.</i>	✓
Resultant correct and tail-to-head method correctly applied. Resultant korrek en stert-by-kopmetode korrek toegepas.	✓

(4)

5.2.4 2 N ✓ right/regs ✓

(2)

[15]

QUESTION 6 / VRAAG 6

6.1 Distance: actual path length between two points. ✓✓
Afstand: werklike padlengte tussen twee punte.

Displacement: shortest path between two points in a particular direction. ✓✓
Verplasing: kortste pad tussen twee punte in 'n spesifieke rigting. (4)

6.2 Distance / *Afstand* = 100 + 100 + 100 ✓ = 300 m ✓ (2)

6.3 Displacement / *Verplasing* = 100 m ✓ east / oos ✓ (2)

6.4 **POSITIVE MARKING FROM 6.3. / POSITIEWE NASIEN VANAF 6.3.**

$$\begin{aligned}
 \text{velocity} &= \frac{\text{displacement}}{\text{time}} / \text{snelheid} = \frac{\text{verplasing}}{\text{tyd}} \checkmark \\
 &= \frac{100 \checkmark}{65 \checkmark} \\
 &= 1,54 \text{ m} \cdot \text{s}^{-1} \text{ right/regs} \checkmark
 \end{aligned}$$

(4)

6.5 **POSITIVE MARKING FROM 6.2. / POSITIEWE NASIEN VANAF 6.2.**

$$\begin{aligned}
 \text{speed} &= \frac{\text{distance}}{\text{time}} / \text{spoed} = \frac{\text{afstand}}{\text{tyd}} \checkmark \\
 &= \frac{300 \checkmark}{65 \checkmark} \\
 &= 4,62 \text{ m} \cdot \text{s}^{-1} \checkmark
 \end{aligned}$$

(3)

[15]

QUESTION 7 / VRAAG 7

7.1 Acceleration is the rate at which velocity changes. ✓✓
Versnelling is die tempo waarteen snelheid verander. (2)

$$\begin{aligned} 7.2.1 \text{ acceleration} &= \frac{\text{change in velocity}}{\text{time}} / \text{vernelling} = \frac{\text{verandering in snelheid}}{\text{tyd}} \checkmark \\ &= \frac{33 - 15 \checkmark}{25 - 10 \checkmark} \\ &= 1,2 \text{ m} \cdot \text{s}^{-2} \text{ right/regs} \checkmark \end{aligned} \quad (4)$$

$$\begin{aligned} 7.2.2 \text{ speed} &= \frac{\text{distance}}{\text{time}} / \text{spoed} = \frac{\text{afstand}}{\text{tyd}} \checkmark \\ 15 \checkmark &= \frac{\text{distance}}{20} \checkmark \\ \text{distance/afstand} &= 300 \text{ m} \checkmark \end{aligned} \quad (4)$$

$$\begin{aligned} 7.2.3 \text{ speed} &= \frac{\text{distance}}{\text{time}} / \text{spoed} = \frac{\text{afstand}}{\text{tyd}} \\ 33 \checkmark &= \frac{333}{\text{time/tyd}} \checkmark \\ \text{time/tyd} &= 10 \text{ s} \checkmark \end{aligned} \quad \begin{array}{l} (3) \\ [13] \end{array}$$

GRAND TOTAL / GROOTTOTAAL: 75