



education

Department of
Education
FREE STATE PROVINCE

CONTROL TEST / *KONTROLETOETS*

GRADE 10 / *GRAAD 10*

**TECHNICAL SCIENCES
*TEGNIJSE WETENSKAPPE***

MEMORANDUM

MARCH 2019 / *MAART 2019*

MARKS: 100 / *PUNTE: 100*

TIME: 2 HOURS / *TYD: 2 UUR*

**This memorandum consists of six pages.
*Hierdie memorandum bestaan uit ses bladsye.***

QUESTION 1 / VRAAG 1

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

QUESTION 2 / VRAAG 2

2.1.1 K ✓ (1)

2.1.2 kg ✓ (1)

2.1.3 cd ✓ (1)

2.1.4 V ✓ (1)

2.2.1 M ✓ (for/vir 1 Mℓ) (1)

2.2.2 6 ✓ (for/vir 1×10^6) (1)

2.3 **ACCEPT ANY OF THE FOLLOWING (2 or 0)**
AANVAAR ENIGE VAN DIE VOLGENDE (2 OF 0)

0,003 x 10^5 (✓✓) (cm)
3 x 10^2
300

(2)

2.4 $155 \text{ m} \cdot \text{s}^{-1} = \frac{155}{1\,000} \checkmark \times 60 \times 60 \checkmark$
 $= 558 \text{ (km} \cdot \text{h}^{-1}) \checkmark$
 $= 5,58 \times 10^2 \text{ (km} \cdot \text{h}^{-1}) \checkmark$

(4)

2.5.1 $2,6 \times 10^4 \checkmark$ (1)

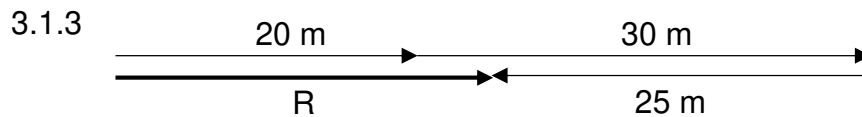
2.5.2 $0,5 \times 10^5 \checkmark$ (1)

[14]

QUESTION 3 / VRAAG 3

3.1.1 Vector: Has magnitude and direction ✓ Scalar: Only magnitude ✓
Vektor: Het grootte en rigting Skalaar: Net grootte (2)

3.1.2 The single vector ✓ having the same effect as all the other vectors acting together. ✓ Die enkele vektor ✓ wat dieselfde uitwerking het as al die ander vektore tesame. ✓ (2)



R = 25 m; forward/voorwaarts
original direction/oorspronklike rigting

Marking criteria / Nasienkriteria	
Correct measurements and direction for two forward components (4 cm & 6 cm) <i>Korrekte meting en rigting vir twee voorwaartse komponente (4 cm & 6 cm)</i>	✓
Correct measurement and direction for backwards component (5 cm) <i>Korrekte meting en rigting vir terugwaartse komponent (5 cm)</i>	✓
Head-to-tail method correctly applied to determine and to show resultant. <i>Kop-by-stertmetode korrek toegepas om resultant te bepaal en te wys.</i>	✓
All components and R have applicable labels. <i>Alle komponente en R het toepaslike byskrifte.</i>	✓
Correct final answer (magnitude and direction) <i>Korrekte finale antwoord (grootte en rigting)</i>	✓

(5)

3.2.1	Option 1 / Opsie 1 Right + $R = x_1 + x_2$ ✓ $= (-25) \checkmark + 20 \checkmark$ $= -5 \text{ cm}$ $= 5 \text{ cm to the left} \checkmark$	Option 2 / Opsie 2 Left + $R = x_1 + x_2$ ✓ $= 25 \checkmark + (-20) \checkmark$ $= 5 \text{ cm}$ $= 5 \text{ cm to the left} \checkmark$
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(4)

3.2.2 1 200 (N) ✓ Left/Links ✓ (2)
[15]

QUESTION 4 / VRAAG 4

4.1 Length of the path/actual path length between two points. (✓✓)
Lengte van die pad tussen twee punte. (2)

4.2.1 Area $\Delta = \frac{1}{2}bh$ ✓
4 = $\frac{1}{2} \times 2 \times h$ ✓
h = 4 m
∴ Distance/Afstand = 4 m ✓ (3)

4.2.2 **POSITIVE MARKING FROM 4.2.1. / POSITIEWE NASIEN VANAF 4.2.1.**
 $PR = \sqrt{a^2 + b^2}$ ✓ (Or correct alternative/of korrekte alternatief)
= $\sqrt{4^2 + 2^2}$ ✓
= 4,47 m
∴ Distance/Afstand = 4,47 m ✓ (3)

4.2.3 **POSITIVE MARKING FROM 4.2.1 AND 4.2.2.**
POSITIEWE NASIEN VANAF 4.2.1 EN 4.2.2.
10,47 m ✓ (1)

4.3 **POSITIVE MARKING FOR MAGNITUDE FROM 4.2.2.**
POSITIEWE NASIEN VIR GROOTTE VANAF 4.2.2.
4,47 m ✓ Away from **P**/In direction of **R**/Or similar
Compass direction not accepted. ✓
Weg vanaf **P**/In rigting van **R**/Of soortgelyk
Kompasrigting nie aanvaarbaar nie. (2)

4.4 $T_{°F} = \frac{9T_{°C}}{5} + 32$ ✓
 $= \frac{9(32)}{5} + 32$ ✓
 $= 89,6 °F$ ✓ (3)
[14]

QUESTION 5 / VRAAG 5

5.1.1 Location of an object in relation to a reference point/origin. (✓✓)
Plek/ligging van 'n voorwerp in terme van 'n verwysingspunt/oorsprong. (2)

5.1.2 Shortest path between two points ✓ in a particular direction. ✓
Kortste pad tussen twee punte ✓ in 'n spesifieke rigting. ✓ (2)

5.1.3 Rate of change of distance. (✓✓)
Tempo van verandering in afstand. (2)

5.2.1 $x_{tot} = x_{A-B} + x_{B-C} + x_{C-D}$ ✓
 $= 160 + 120 + 80$ ✓
 $= 360m$ ✓ (3)

5.2.2 $\Delta x = x_f - x_i$
 $= 120 - 0$
 $= 120 m$ ✓ *East; Oos* ✓ (2)

5.2.3 **POSITIVE MARKING FROM 5.2.2. / POSITIEWE NASIEN VANAF 5.2.2.**

$$\begin{aligned} \text{Velocity} &= \frac{\text{displacement}}{\text{time}} \quad \checkmark & \text{Snelheid} &= \frac{\text{verplasing}}{\text{tyd}} \\ &= \frac{120 \checkmark}{(3 \times 60) \checkmark} \\ &= 0,67 \text{ m} \cdot \text{s}^{-1} \quad \checkmark \end{aligned} \quad \begin{matrix} (4) \\ \mathbf{[15]} \end{matrix}$$

QUESTION 6 / VRAAG 6

6.1.1 Rate of change of velocity. (✓✓)
Tempo van verandering in snelheid. (2)

6.1.2 $Acceleration = \frac{\text{change in velocity}}{\text{time}} \checkmark$ $Versnelling = \frac{\text{verandering in snelheid}}{\text{tyd}}$
 $= \frac{25 - 13}{5} \checkmark$
 $= 2,4 \text{ m} \cdot \text{s}^{-2} \checkmark$ (4)

6.2.1 $t_A = 0,02 \times 5 \checkmark = 0,1 \text{ s} \checkmark$ (2)

6.2.2 POSITIVE MARKING FROM 6.2.1 / POSITIEWE NASIEN VANAF 6.2.1.

$Velocity_A = \frac{\text{displacement}}{\text{time}} \checkmark$ $Snelheid = \frac{\text{verplasing}}{\text{tyd}}$
 $= \frac{0,05}{0,1} \checkmark$
 $= 0,5 \text{ m} \cdot \text{s}^{-1} \checkmark$ (4)

6.2.3 $Velocity_B = \frac{\text{displacement}}{\text{time}}$
 $= \frac{0,07}{0,02 \times 7} \checkmark$
 $= 0,5 \text{ m} \cdot \text{s}^{-1} \checkmark$ (3)

6.2.4 Velocity is constant ✓ $Snelheid$ is konstant. ✓
Acceleration is zero ✓. $Versnelling$ is nul. ✓ (2)

6.3.1 $Speed = \frac{\text{distance}}{\text{time}}$ $Spoed = \frac{\text{afstand}}{\text{tyd}}$
 $6 = \frac{\text{distance}}{8} \checkmark$
 $Distance; Afstand = 48 \text{ m} \checkmark$ (2)

6.3.2 POSITIVE MARKING FROM 6.3.1. / POSITIEWE NASIEN VANAF 6.3.1.

<u>Option 1 / Opsie 1</u>	<u>Option 2 / Opsie 2</u>
South +	North +
$R = -48 \checkmark + 36 \checkmark$	$R = 48 \checkmark + (-36) \checkmark$
$= -12 \text{ m}$	$= 12 \text{ m}$
$= 12 \text{ m}; \text{north/noord} \checkmark$	$= 12 \text{ m}; \text{north/noord} \checkmark$

(3)
[22]

GRAND TOTAL / GROOTTOTAAL: 100