



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE /  
NASIONALE SENIOR  
SERTIFIKAAT**

**GRADE/GRAAD 10**

**NOVEMBER 2020**

**TECHNICAL SCIENCES P1/  
TEGNIESE WETENSKAPPE V1  
MARKING GUIDELINE/NASIENRIGLYN  
(EXEMPLAR/EKSEMPLAAR)**

**MARKS/PUNTE: 150**

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This marking guideline consists of 11 pages./  
*Hierdie nasienrglyn bestaan uit 11 bladsye.*

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**QUESTION/VRAAG 1**

1.1 D ✓✓

1.2 D ✓✓

1.3 B ✓✓

1.4 D ✓✓

1.5 B ✓✓

1.6 B ✓✓

1.7 A ✓✓

1.8 A ✓✓

1.9 A ✓✓

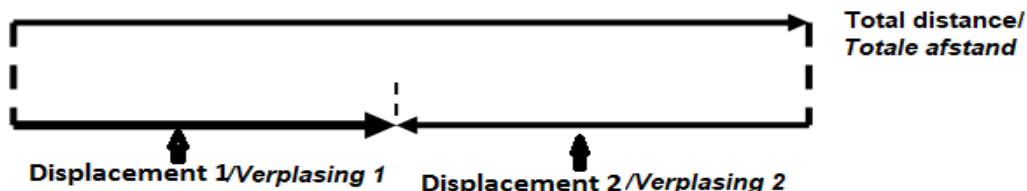
1.10 B ✓✓

(10 x 2) **[20]**

**QUESTION/VRAAG 2**

- 2.1 Vector is a physical quantity with both magnitude and direction and ✓✓  
 scalar is a physical quantity with magnitude only. ✓✓  
*Vektor is 'n fisiese hoeveelheid met beide grootte en rigting ✓✓ en*  
*skalaar is fisiese hoeveelheid met slegs grootte. ✓✓* (4)

2.2



- Orientation of vectors; ✓ Total Distance ✓ Displacement 1 ✓  
 Displacement 2 ✓  
*Rigting van vektore ; ✓ Totale afstand ; ✓ Verplasing 1 ; ✓ Verplasing 2 ✓* (4)

- 2.3 2.3.1 Distance from home to shop + shop to point of rest/  
*Afstand van huis na winkel + winkel na punt van rus*  
 $= 500 \text{ m} + 280 \text{ m}$  ✓  
 $= 780 \text{ m}$  ✓ (2)

- 2.3.2 Displacement = distance travelled to shop + (- distance from  
 shop to point of rest) ✓  
*Verplasing = afstand afgelê na winkel + (-afstand vanaf winkel*  
*na punt van rus)* ✓  
 $= 500 \text{ m} + (-280 \text{ m})$  ✓  
 $= 220 \text{ m}$  (easterly direction/oostelike rigting) ✓ (3)

- 2.4  $t = 48 \text{ s}$   
 $s = 400 \text{ m}$   
 Speed =  $\frac{\text{distance}}{\text{time}}$  ✓ / *Spoed = \frac{\text{afstand}}{\text{tyd}}* ✓  
 $= \frac{400}{48}$  ✓  
 $= 8,333 \text{ m/s}$  ✓ (3)

- 2.5 2.5.1  $48 \text{ s}$  to hours / *48 s na ure*  
 $= \frac{48}{3600}$  ✓  
 $= 0,0133 \text{ hours/uur}$  ✓ (2)

- 2.5.2  $400 \text{ m}$  to km/*400 m na km*  
 $= \frac{400}{1000}$  ✓  
 $= 0,4 \text{ km}$  ✓ (2)

$$\begin{aligned} 2.5.3 &= \frac{1\,800}{900\,000} \\ &= \frac{18 \times 100}{900 \times 1\,000} \checkmark \\ &= \frac{18}{9\,000} \checkmark \\ &= 0,002 \text{ OR/OF } \frac{2}{1\,000} \checkmark \end{aligned} \quad (3)$$

$$\begin{aligned} 2.5.4 \quad t &= \frac{v_f - v_i}{a} \checkmark \\ &= \frac{280 - 140}{35} \checkmark \\ &= 4 \text{ s } \checkmark \end{aligned} \quad (4)$$

2.6 2.6.1 Scalar / Skalaar  $\checkmark$  (1)

2.6.2 Vector / Vektor  $\checkmark$  (1)

2.6.3 Vector / Vektor  $\checkmark$  (1)

2.6.4 Scalar / Skalaar  $\checkmark$  (1)

2.6.5 Scalar / Skalaar  $\checkmark$  (1)

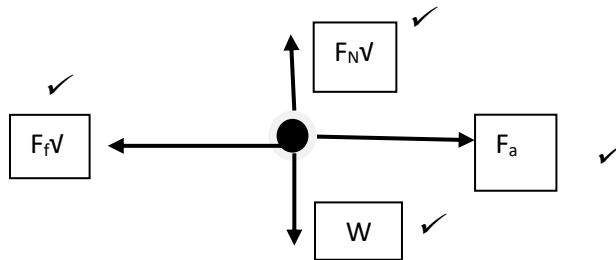
[32]

**QUESTION/VRAAG 3**

3.1 3.1.1 Tension force is a pulling force/ stretching force; it causes the object on which it acts to tend to stretch. ✓✓/Spanningskrag is die trek/trekkrag; dit veroorsaak dat die voorwerp waarop dit inwerk rek. ✓✓ (2)

3.1.2 Compressive force causes the object on which it acts to tend to compress (to be squashed or compacted) ✓✓/Kompressiekrag veroorsaak dat die voorwerp waarop krag inwerk, saamgepers word (om platgedruk of gekompakteer word). (2)

3.2



$F_f$  : Frictional Force / Wrywingskrag

$F_N$  : Normal / Normale

$F_a$  : Applied Force / Toegepaste krag

$F_g/W$ : Weight or Gravitational force / Gewig of Gravitatiekrag (4)

3.3  $F_f$  (Frictional force)/(wrywingskrag) ✓  $F_a$  ( Applied force /Toegepaste krag) ✓  
 (3)

3.4  $F_R = F_a - F_f$  ✓

$$= 100 - 100 \quad \checkmark$$

$$= 0 \text{ N} \quad \checkmark \quad (3)$$

3.5 No / Nee ✓ (1)

**[15]**

**QUESTION/VRAAG 4**

- 4.1 Equilibrant of force is the force that has the same magnitude as the resultant force ✓ but it acts in the opposite direction. ✓/  
*Ekwilibrante krag is 'n krag met dieselfde grootte as die van die resultant krag ✓ maar in die teenoorgestelde rigting. ✓* (2)

- 4.2 Upward forces = downward forces ✓/Opwaartse kragte = afwaartse kragte

Take moment about RA / Neem moment om RA

ACWM = CWM / AKWM = KWM

$$(80 \times 2) \checkmark + (70 \times 4) \checkmark + (100 \times 7) \checkmark + (30 \times 10) \checkmark - (RB \times 12) = 0 \checkmark$$

$$RA = 160 \text{ KN} \checkmark$$

Take moment about RB / Neem moment om RB

$$RB = 12 \times 12 \checkmark = 120 \text{ KN} \checkmark$$
 (8)

- 4.3 Upward Forces = Downward Forces / Opwaartse Krag = afwaartse Krag

$$RA + RB \checkmark = 80 + 70 + 100 + 30$$

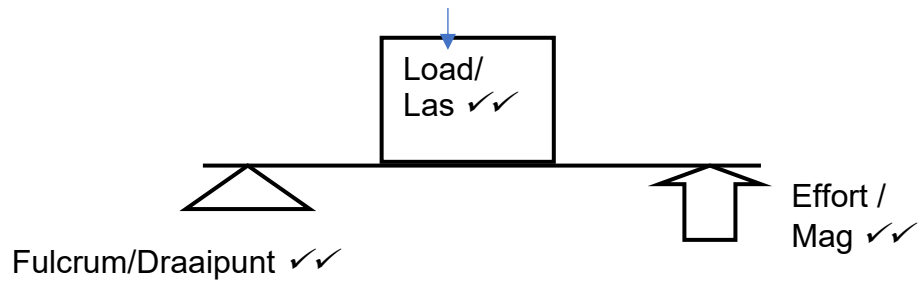
$$160 + 120 = 280 \text{ KN} \checkmark$$
 (2)

- 4.4 4.4.1 Moment of a force about a point is defined as the turning effect of the force about that point. ✓✓/  
*Moment van 'n krag om 'n punt word gedefinieer as die draai-effek van die krag om die spesifieke punt. ✓✓* (2)

- 4.4.2 A beam is a rigid horizontal structural member designed to carry a vertical load. ✓✓/  
*'n Balk is 'n enkele onbuigsame lengte materiaal wat horisontaal gestut word en gebruik word om vertikale massa te dra of te ondersteun. ✓✓* (2)

- 4.5  $F = 20 \text{ N}$   
 $d = 5,8 \text{ m}$   
 $M = F \times d \checkmark$   
 $= 20 \times 5,8 \checkmark$   
 $= 116 \text{ N} \checkmark$  (3)

4.6



(6)

4.7 Wheelbarrow / *Kruiwa*  
Nutcracker / *Neutkraker*  
(Any ONE / *Enige EEN*)

(1)  
**[26]**

**QUESTION/VRAAG 5**

5.1 Gravitational potential energy is the energy it has because of its position from the surface of the earth ✓✓ / *Gravitasie-potensiële energie is die energie as gevolg van sy posisie vanaf die oppervlak van die aarde.* (2)

5.2 Electric energy / *Elektriese energie* ✓  
 Heat energy / *Hitte-energie* ✓  
 Light energy / *Lig-energie* ✓  
 Sound energy / *Klank-energie* ✓ (4)

5.3  $E_k = \frac{1}{2} m v^2$  ✓  
 $= \frac{1}{2} 0,45 (30)^2$  ✓  
 $= 202,5 \text{ J}$  ✓ (3)

5.4 5.4.1  $E_m = E_p + E_k$  ✓  
 $= 1,5 + 5$  ✓  
 $= 6,5 \text{ J}$  (3)

5.4.2  $E_p = mgh$  ✓  
 $1,5 = 0,1 \times 9,8 h$  ✓  
 $\therefore \frac{1,5}{0,98} = \frac{0,98}{0,98} h$  ✓  
 $h = 1,531 \text{ m}$  ✓

**OR/OF**

$E_p = mgh$  ✓  
 $h = \frac{E_p}{mg}$  ✓  
 $= \frac{1,5}{(0,1 \times 9,8)}$  ✓  
 $h = 1,531 \text{ m}$  ✓ (4)  
**[16]**



**QUESTION/VRAAG 6**

- 6.1 MORE THAN / MEER AS ✓ (1)
- 6.2 The sphere is negatively charged. ✓ / Die sfeer is negatief gelaai. ✓ (1)
- 6.3 
$$n = \frac{\text{charge}}{\text{electron charge}} \checkmark / \frac{\text{lading}}{\text{elektron lading}} = \frac{Q}{e^-}$$
$$= -6 \times 10^{-9} / 1,6 \times 10^{-19} \checkmark$$
$$= 3,75 \times 10^{10} \checkmark$$
 (3)
- 6.4 
$$Q = \frac{V}{C} \checkmark$$
$$= \frac{6}{5 \times 10^{-6}} \checkmark$$
$$= 1\,200\,000 \text{ C OR/OF } 12\,00 \times 10^3 \text{ C} \checkmark$$
 (3)
- 6.5 6.5.1 States that the nett charge in an isolated system is constant during any physical process. ✓✓ Die netto lading in 'n geïsoleerde stelsel is konstant tydens enige fisiese proses. ✓✓ (2)
- 6.5.2 B TO C / B NA C ✓✓ (2)
- 6.5.3 C has an excess of electrons / C het 'n oormaat elektrone ✓ (1)

**[13]**

## QUESTION/VRAAG 7

- 7.1 7.1.1 Electromotive force (emf) is the potential difference across the terminals of the cell ✓ when there is no current flowing in the circuit ✓/

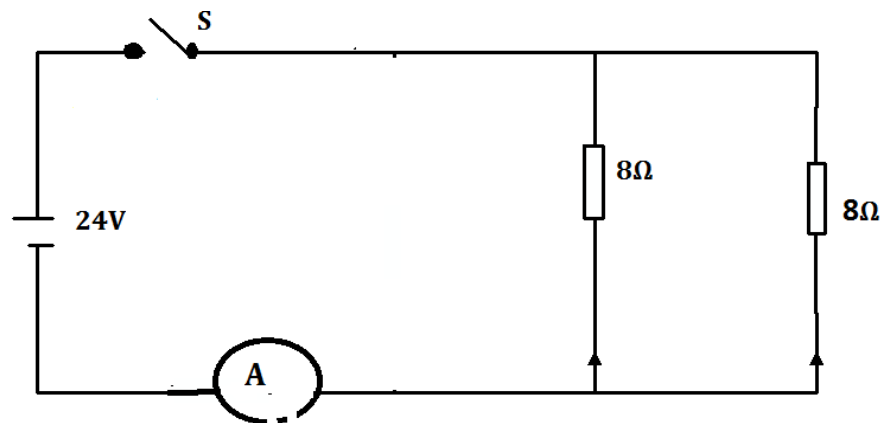
*Elektromotoriese krag (emk) is die potensiaalverskil oor die terminale van die sel ✓ indien die stroombaan oop is of geen stroom vloei nie. ✓*

(2)

- 7.1.2 Current is the rate of flow of charge. ✓✓/ *Elektriese stroom is die tempo van die vloei van lading. ✓✓*

(2)

- 7.2 7.2.1



Circuit / Stroombaan	1 mark / punt ✓
Resistors	1 mark each / punt elk ✓✓
Ammeter	1 mark / punt ✓
Switch / Skakelaar S	1 mark / punt ✓
Emf of 24 V / EMK van 24 V	1 mark / punt ✓

(6)

$$7.2.2 \quad R_p = \frac{R_1 \times R_2}{R_1 + R_2} \checkmark$$

$$= \frac{8 \times 8}{8 + 8} \checkmark$$

$$\therefore R_T = 4 \Omega \checkmark$$

OR/OF

$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} \checkmark$$

$$= \left( \frac{1}{8} + \frac{1}{8} \right) \checkmark$$

$$R_t = 4 \Omega \checkmark$$

(3)  
[13]

**QUESTION/VRAAG 8**

- 8.1 Potential difference is the difference between the potentials of two points in an electric field. ✓✓ / *Dit is die verskil in die hoeveelheid energie wat ladingdraers tussen twee punte in 'n stroombaan het.*

**OR/OF**

It is the difference in the amount of energy that charge carriers have between two points in a circuit. ✓✓ / *Potensiaalverskil is die spanning tussen twee punte in 'n elektriese veld.* ✓✓

(2)

- 8.2 A – Ammeter ✓

V – Voltmeter ✓

(2)

- 8.3 8.3.1  $I_T = I_1 + I_2 + I_3$  ✓

$$I_T = 198 + 140 + 165 \quad \checkmark$$

$$= 503 \times 10^{-3} \text{ A} \quad \checkmark \quad \text{OR/OF } 503 \text{ mA}$$

(3)

- 8.3.2 In a parallel circuit the voltage is constant. // *In 'n parallelle stroom is die spanning konstant.* ✓✓

(2)

- 8.3.3 Supply / *Battery* ✓

Resistors connected in parallel // *Resistors in parallel* ✓

Connecting wires / *Geleidingsdrade* ✓

Voltmeter ✓

(Any THREE / *Enige DRIË*) (3)

8.3.4  $I = \frac{Q}{t}$  ✓

$Q = 2\text{C}, t = 0,6 \text{ s}$  and  $I = ?$

$$= \frac{10}{0,6} \quad \checkmark$$

$$= 16,667 \text{ A} \quad \checkmark$$

(3)

**[15]****TOTAL/TOTAAL: 150**