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**NATIONAL
SENIOR CERTIFICATE /
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SERTIFIKAAT**

GRADE/GRAAD 10

NOVEMBER 2018

**TECHNICAL SCIENCES P1/
TEGNIJSE WETENSKAPPE V1
MARKING GUIDELINE/NASIENRIGLYN**

MARKS/PUNTE: 150

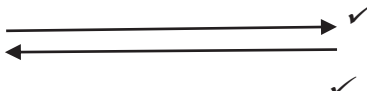
This marking guideline consists of 7 pages./
Hierdie nasienrglyn bestaan uit 7 bladsye.

QUESTION/VRAAG 1

- 1.1 D ✓✓
 1.2 D ✓✓
 1.3 A ✓✓
 1.4 A ✓✓
 1.5 C ✓✓
 1.6 B ✓✓
 1.7 D ✓✓
 1.8 C ✓✓
 1.9 C ✓✓
 1.10 A ✓✓

(10 x 2) [20]

QUESTION/VRAAG 2

- 2.1 Scalar is a quantity that has magnitude only ✓✓
Skalaar is 'n hoeveelheid wat slegs grootte het. ✓✓
 Vector is a quantity with both magnitude and direction ✓✓
Vektor is 'n hoeveelheid met beide grootte en rigting. ✓✓ (4)
- 2.2 2.2.1 2,23 ✓✓ (kg) (2)
 2.2.2 2 900 ✓✓ (m) (2)
 2.2.3 $2,23 \times 10^3$ ✓✓ (2)
- 2.3 Shortest distance between two points in a particular direction **OR**
 Straight line distance from the starting point to the finishing point with direction ✓✓
*Kortste afstand tussen twee punte in 'n spesifieke rigting **OF***
Die reguitlyn tussen die beginpunt en eindpunt met rigting ✓✓ (2)
- 2.4 2.4.1 2,9 km ✓ (or 2 900 m) (1)
 2.4.2 2 km ✓ (or 2 000 m) to the RIGHT / na REGS ✓ (2)
- 2.5 $v = \text{displacement/time}$ $v = \text{verplasing/tyd}$ ✓
 $= 2\,000 \text{ } \checkmark / 1\,800 \text{ } \checkmark = 1,11 \text{ m.s}^{-1}$ ✓ (4)
- 2.6  ✓
 Resultant displacement/Resultante verplasing = 0 N ✓ (3)

2.7.1 No / Nee ✓

There are equal changes in displacement in equal time intervals ✓
 Therefore velocity is constant ✓
Daar is gelyke veranderinge in verplasing in gelyke tydintervalle ✓
Dus is die snelheid constant ✓

(3)

2.7.2 $T = 1/F = 1/50$ ✓ = 0,02s ✓Time/tyd = $5 \times 0,02$ ✓ = 0,1 s ✓

(4)

2.7.3 $v = \text{displacement} / \text{time} = 5 \times (20/100)$ ✓ / 0,1 ✓ = 2 m.s^{-1} ✓ $v = \text{verplasing/tyd} = 5 \times (20/100)$ ✓ / 0,1 ✓ = 2 m.s^{-1} ✓

OR

$$v = \frac{\text{Displacement / Verplasing}}{\text{Time / Tyd}} \quad \checkmark$$

$$= \frac{20 \text{ cm}}{0,1} \quad \checkmark \checkmark$$

$$= \frac{0,2 \text{ m}}{0,1} \quad \checkmark$$

$$= 2 \text{ m.s}^{-1} \quad \checkmark$$

(4)

[33]**QUESTION/VRAAG 3**

3.1 Single force which can produce the same effect as two or more forces ✓✓

'n Enkel krag wat dieselfde effek het as twee of meer kragte ✓✓

(2)

3.2 3.2.1 F_1 Normal/Normaal ✓

(1)

3.2.2 F_2 Applied force/Toegepaste krag ✓

(1)

3.2.3 F_3 Weight or Force of gravity/Gewig of Swaartekrag ✓

(1)

3.2.4 F_4 Friction/Wrywing ✓

(1)

3.3 Weight/Gewig ✓ or/of Force of gravity/Swaartekrag ✓

(1)

3.4 $F_g = mg$ ✓ = $60 \times 9,8$ ✓ = 588 N ✓

(3)

3.5 Take right as positive/Neem regs as positief

 $F_{\text{resultant}} = 50 + (-15) = 35 \text{ N}$ ✓✓ to the right/na regs ✓

(3)

OR/OF

Take left as positive/Neem links as positief

 $F_{\text{resultant}} = 15 + (-50) = -35 \text{ N} = 35 \text{ N}$ ✓✓ to the right/na regs ✓

3.6 3.6.1 $F_{\text{resultant}} = 0 \text{ N}$ ✓ (1)

3.6.2 Equilibrant / *Ekwilibrant* ✓ (1)

3.6.3 $F = 35 \text{ N}$ ✓ to the LEFT / *na LINKS* ✓ (2)

[17]

QUESTION/VRAAG 4


4.1 4.1.1 Moment ✓ (of a force / *van 'n krag*) / *Wringkrag* (1)

4.1.2 Cantilever / *Cantilever* ✓ (1)

4.1.3 Mechanical advantage / *Meganiese voordeel* ✓ (1)

4.2 4.2.1 Sum of moments clockwise / *Som van momente kloksgewys*
 $= F_1 \times d_1 + F_2 \times d_2$ ✓
 $= 3\,000 \times 2 + 4\,000 \times 4$ ✓
 $= 22\,000 \text{ N.m}$ ✓ or (22 kN) (4)

4.2.2 $M_{\text{ACW}} = M_{\text{CW}}$ ✓ (Law of moments / *Wet van momente*)
 $R_B \times 6 = 22\,000$ ✓
 $R_B = 3\,670 \text{ N}$
 $R_A + R_B = F_1 + F_2$ ✓ (Beam is in equilibrium / *Balk is in ewewig*)
 $R_A + 3\,670 = 3\,000 + 4\,000$ ✓
 $R_A = 3\,330 \text{ N}$ ✓ (6)

4.3  (6)

4.4 4.4.1 Class ONE / *Klas EEN* ✓
 Load is between effort and fulcrum / *Vrag is tussen las en fulkrum* ✓ (2)

4.4.2 $F_L / F_E = d_E / d_L$ ✓
 $200 / 50 = (20 / 100) \times d_L$ ✓
 $d_L = 0,05 \text{ m}$ ✓ (4)

[25]

QUESTION/VRAAG 5

5.1.1 Energy a body has due to its position above the ground. ✓✓ (2)
Energie van 'n liggaam as gevolg van sy posisie bokant die grond ✓✓

5.1.2 Sum of kinetic energy and potential energy ✓✓ (2)
Som van die kinetiese en potensiële energie ✓✓

5.2.1 $E_{k \text{ at } P} = \frac{1}{2} mv^2$ ✓
 $= \frac{1}{2} \times 60 \times 4^2$ ✓
 $= 480 \text{ J}$ ✓ (3)

5.2.2 $U_{\text{at } Q} = mgh$ ✓
 $= 60 \times 9,8 \times 3$ ✓
 $= 1\,764 \text{ J}$ ✓ (3)

5.3 $U_{\text{at } P} = mgh$
 $2\,469 \text{ ✓} = 60 \times 9,8 \times h \text{ ✓}$
 $4,2 \text{ m ✓} = h \text{ Accept/Aanvaar } 4,199 \text{ m}$ (3)

5.4 $E_{k \text{ at } Q} = \frac{1}{2} mv^2$
 $705,6 \text{ ✓} = \frac{1}{2} (60) \text{ ✓} v^2$
 $v = 4,85 \text{ m.s}^{-1} \text{ ✓}$ (3)
[16]

QUESTION/VRAAG 6

6.1 REMOVED / VERWYDER ✓ (1)

6.2 $n_e = \Delta Q/e$ ✓
 $= 6 \times 10^{-6} / 1,6 \times 10^{-19} \text{ ✓}$
 $= 3,75 \times 10^{-19} \text{ ✓} e^-$ (3)

6.3 To prevent charge from leaking ✓✓ (2)
Om te verhoed dat lading uitlek ✓✓

6.4 6.4.1 Total charge of an isolated system remains constant ✓✓ (2)
Totale lading van 'n geïsoleerde system bly constant. ✓✓

6.4.2 From **R** to **P** / Van **R** na **P** ✓ (1)

6.4.3 $Q_{\text{total before}} / Q_{\text{totaal voor}} = (+6 \times 10^{-6} + 0)$
 $Q_{\text{total after}} = Q_{\text{total before}} / Q_{\text{totaal na}} = Q_{\text{totaal voor}}$
 $Q_R = +6 \times 10^{-6} / 2 \text{ ✓✓} = +3 \times 10^{-6} \text{ C ✓}$ (3)
[12]

QUESTION/VRAAG 7

7.1 Rate of flow of charge/ *Tempo van vloeï van lading* ✓✓ (2)

7.2 7.2.1 CIRCUIT/STROOMBAAN 2 ✓ (1)

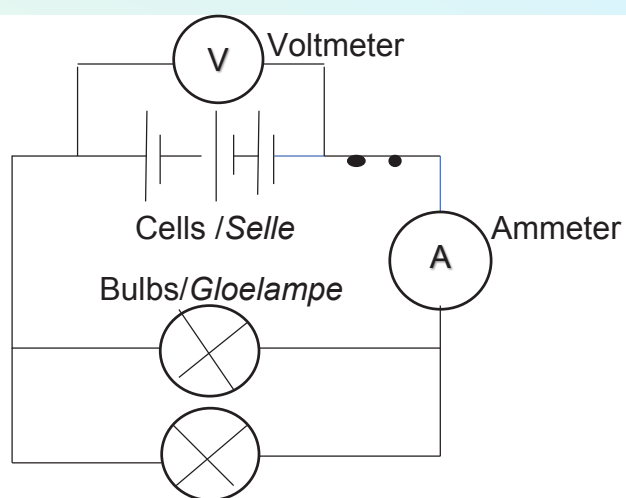
7.2.2 CIRCUIT/STROOMBAAN 1 ✓ (1)

7.3 Y to/na X ✓ (1)

7.4 7.4.1 EMF = 12 V ✓ (1)

7.4.2 $R_p = R_1 R_2 / R_1 + R_2$ ✓ = $12 \times 12 / (12 + 12)$ ✓ = 6Ω ✓ (3)

7.5



Marking criteria/Merk kriteria
Three cells / Drie selle ✓
Voltmeter ✓
Ammeter ✓
Bulbs in parallel/Gloeilampe in parallel ✓
Switch/Skakelaar ✓

(5)

[14]

QUESTION/VRAAG 8

- 8.1 8.1.1 Opposition to flow of electric current ✓✓ (2)
 Opposisie teen die vloeï van elektriese stroom ✓✓
- 8.1.2 Length of conductor/*Lengte van die geleier* ✓ (1)
- 8.1.3 Temperature/*Temperatuur* ✓
 Thickness (Cross sectional area)/*Dikte (Deursnit-area)* ✓ (3)
 Type of conductor/*Tipe geleier* ✓
- 8.2 8.2.1 The longer the conductor the higher the resistance OR
 The shorter the conductor the lower the resistance OR
 Resistance is directly proportional to the length of the
 conductor ✓✓
 *Hoe langer die geleier, hoe hoër is die weerstand **OF***
 *Hoe korter die geleier, hoe laer is die weerstand **OF***
 Weerstand is direk eweredig aan die lengte van die geleier ✓✓ (2)
- 8.2.2 $9 \sqrt{\sqrt{(\Omega)}}$ (2)
- 8.2.3 Gradient/Gradiënt = $(18 - 9) \sqrt{/(7 - 3) \sqrt{}} = 2,25 \sqrt{}$ (3)
 [13]

TOTAL/TOTAAL: 150