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

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

QUESTION/*VRAAG* **1**

1.1 D ✔✔

1.2 D ✔✔

1.3 B ✔✔

1.4 D ✔✔

1.5 B ✔✔

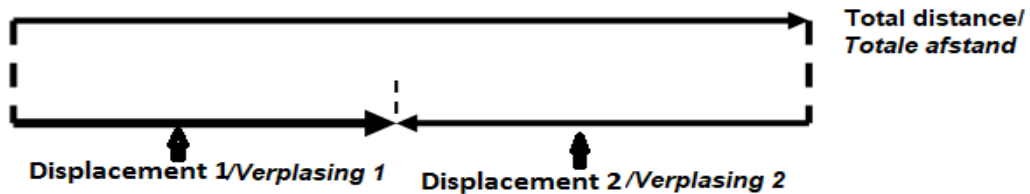1.6 B ✔✔

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 m + 280 m ✓
= 780 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 m + (-280 m) ✓
= 220 m (easterly direction/*oostelike rigting*) ✓ (3)

2.4   t = 48 s
s = 400 m
Speed = $\frac{distance}{time}$ ✓/ *Spoed =* $\frac{afstand}{tyd}$ ✓
= $\frac{400}{48}$ ✓

= 8,333 m/s ✓ (3)

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

2.5.2   400 m to km/400 m na km

= $\frac{400}{1000}$ ✓

= 0,4 km ✓ (2)

2.5.3 $= \dfrac{1\,800}{900\,000}$

$= \dfrac{18 \times 100}{900 \times 1\,000}$ ✓

$= \dfrac{18}{9\,000}$ ✓

$= 0,002$ **OR/OF** $\dfrac{2}{1\,000}$ ✓   (3)

2.5.4 $t = \dfrac{vf - vi}{a}$ ✓

$= \dfrac{280 - 140\checkmark}{35\checkmark}$

$= 4\ s$ ✓   (4)

2.6   2.6.1   Scalar / *Skalaar* ✓   (1)

     2.6.2   Vector / *Vektor* ✓   (1)

     2.6.3   Vector / *Vektor* ✓   (1)

     2.6.4   Scalar / *Skalaar* ✓   (1)

     2.6.5   Scalar / *Skalaar* ✓   (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
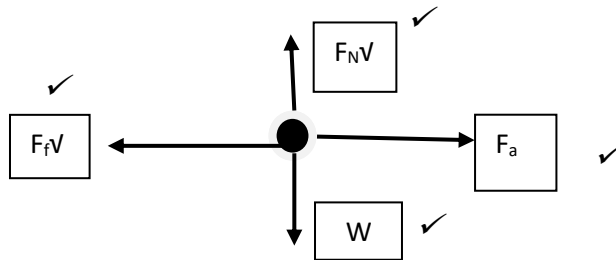
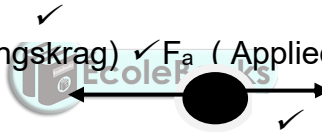F_f : Frictional Force / *Wrywingskrag*
F_N : Normal / *Normale*
F_a : Applied Force / *Toegepaste krag*
F_g/W: Weight or Gravitational force / *Gewig of Gravitasiekrag*   (4)

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

(3)

3.4 $F_R = F_a – F_r$ ✓

    = 100 –100 ✓

    = 0 N ✓   (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 x 2) ✓ + (70 x 4) ✓ + (100 x 7) ✓ +(30 x 10) ✓ – (RB x 12) = 0 ✓
RA = 160 KN ✓

Take moment about RB / *Neem moment om RB*
RB = 12 x 12 ✓ = 120 KN ✓   (8)

4.3   <u>Upward Forces = Downward Forces / *Opwaartse Krag = afwaartse Krag*</u>

RA + RB ✓   = 80 + 70 + 100 + 30

160 + 120   = 280 KN ✓   (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 N
d = 5,8 m
M = F x d ✓
    = 20 x 5,8 ✓
    = 116 N ✓   (3)

4.6

Load/
Las ✓✓

Fulcrum/Draaipunt ✓✓

Effort /
Mag ✓✓
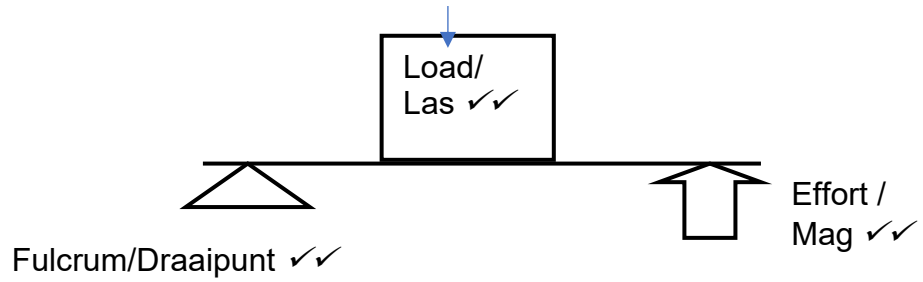
(6)

4.7   Wheelbarrow / *Kruiwa*
Nutcracker / *Neutekraker*
(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 $E_k = \frac{1}{2} m v^2$ ✓

       $= \frac{1}{2} 0,45 \ (30)^2$ ✓

       $= 202,5$ J ✓   (3)

5.4   5.4.1 $E_m = E_p + E_k$ ✓

              $= 1,5 + 5$ ✓

              $= 6,5$ J   (3)

       5.4.2 $E_p = mgh$ ✓

              $1,5 = 0,1 \times 9,8 \ h$ ✓

              $\therefore \frac{1,5}{0,98} = \frac{0,98}{0,98} \ h$ ✓

              $h = 1,531$ m ✓

                              OR/OF

              $E_p = mgh$ ✓

              $h = \frac{Ep}{mg}$ ✓

              $= \frac{1,5}{(0,1 x \ 9,8)}$ ✓

              $h = 1,531$ 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 $n = \frac{charge}{electron\ charge}$ ✓ / $\frac{lading}{elektron\ lading}$ $= \frac{Q}{e-}$

      $= -6 \times 10^{-9} / 1{,}6 \times 10^{-19}$ ✓

      $= 3{,}75 \times 10^{10}$ ✓   (3)

6.4 $Q = \frac{V}{C}$ ✓

    $= \frac{6}{5 \times 10^{-6}}$ ✓

    $= 1\ 200\ 000$ C **OR/OF** $12\ 00 \times 1\ 0^3$ C ✓   (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 ✓ /
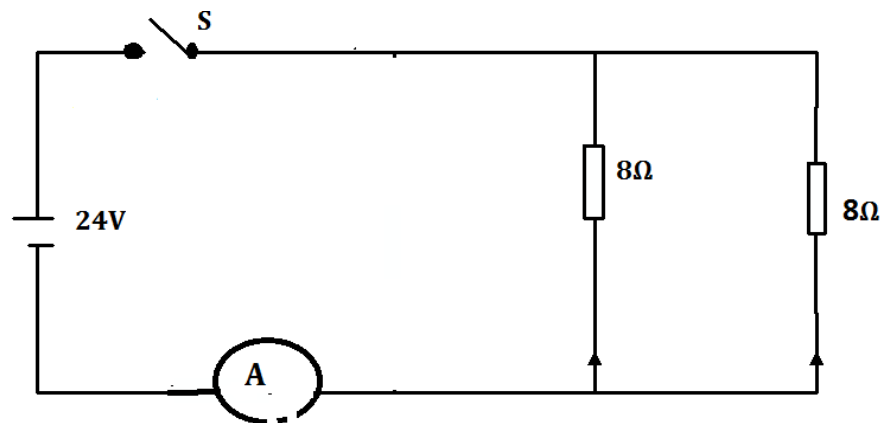*Elektromotoriese krag (emk) is die potensiaalverskil oor die terminale van die sel* ✓ *indien die stroombaan oop is of geen stroom vloei nie.* ✓ (2)

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 $R_p = \frac{R1 \times R2}{R1+R2}$ ✓

$= \frac{8 \times 8}{8+8}$ ✓

$\therefore R_T = 4 \ \Omega$ ✓

OR/OF

$\frac{1}{Rt} = \frac{1}{R1} + \frac{1}{R2}$ ✓

$= (\frac{1}{8} + \frac{1}{8})$ ✓

$R_t = 4 \ \Omega$ ✓ (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. ✓✓ / *Potentiaalverskil is die spanning tussen twee punte in 'n elektriese veld.* ✓✓   (2)

8.2   A – Ammeter ✓

V – Voltmeter ✓   (2)

8.3   8.3.1 $I_T = I_1 + I_2 + I_3$ ✓
$I_T = 198 + 140 + 165$ ✓
$= 503 \times 10^{-3}$ A ✓ **OR/OF** 503 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 DRIE*)   (3)

8.3.4 $I = \dfrac{Q}{t}$ ✓   Q= 2C, t = 0,6 s and I = ?

$= \dfrac{10}{0,6}$ ✓

= 16,667 A ✓   (3)
[15]

TOTAL/*TOTAAL*:   150