



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE /
NASIONALE SENIOR
SERTIFIKAAT**

GRADE/GRAAD 10

NOVEMBER 2019

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

MARKS/PUNTE: 150

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

QUESTION/VRAAG 1

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

(10 x 2) (20)

QUESTION/VRAAG 2

- 2.1 Vector is a physical quantity with both magnitude and direction. ✓✓
Vektor is 'n fisiese hoeveelheid met beide grootte en rigting. ✓✓ (2)
- 2.2 Displacement/*Verplasing* ✓
 Momentum/*Momentum* ✓
 Force/*Krag* ✓
 Velocity/*Snelheid* ✓ (Any TWO)/(*Enige TWEE*) (2)
- 2.3 2.3.1 122 000 g → kg
 = 122 000 ÷ 1 000 ✓
 = 122 kg ✓ (2)
- 2.2.3 24 hours to seconds / *24 ure na sekondes*
 = 24 × 3600 ✓
 = 86 400 sec/sek ✓ (2)
- 2.4 t = 24 hours/*uur*
 dt = 2 000 cm
 dw = 500 m
 St = S1 + S2 ✓
 = 500 + 20 × 10⁻² ✓
 = 5,2 × 10⁻² m ✓ (3)

- 2.5 2.5.1 Displacement is a shortest distance between two points./*Verplasing is die korste afstand tussen twee punte.* ✓✓

OR/OF

Straight line distance from the starting point to the finishing point with direction. ✓✓/ *Reguitlyn afstand vanaf beginpunt na die eindpunt met rigting.* ✓✓

2.5.2 Transmission range/*Sender reeks* = 15 + 20 ✓ – 10 ✓
= 25 m ✓

OR/OF

Transmission range = total distance – return distance ✓
Sender reeks = totale afstand – terugkoms afstand ✓
= 35 – 10 ✓
= 25 m ✓

(3)

2.5.3 $S = \frac{d}{\Delta t}$ ✓
 $= \frac{25 \checkmark}{(3,4 \times 60) \checkmark}$

= 0,122 m.s⁻¹ ✓

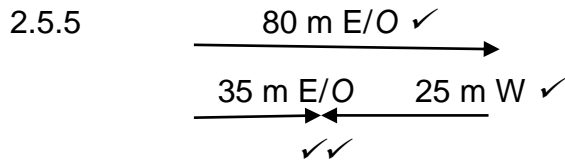
(4)

2.5.4 Total distance/*totale afstand* = 15 + 20 ✓
= 35 m due East/oos ✓

(total distance must have a direction (– 1) omit mark if the learner did not show direction)

(*totale afstand moet rigting het. (– 1) punt as leerder geen rigting aandui nie.*)

(2)



(Consider magnitude and directions please)/ (oorweeg grootte en rigting)

(4)

2.6 2.6.1 10 s ✓

(1)

2.6.2 $F = \frac{1}{T}$ ✓

$= \frac{1}{10}$ ✓

$= 0,1 \text{ Hz}$ ✓

(3)

2.6.3 $v = \frac{d}{t}$ ✓

$= \frac{20}{10}$ ✓

$= 2 \text{ cm/s}$ ✓

(3)

[33]**QUESTION/VRAAG 3**

3.1 A – First quadrant / Eerste kwadrant

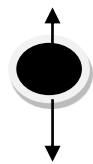
B – Y-axis / Y-as

C – Point of origin/ O point / Punt van oorsprong / O punt

D – X-axis / X-as

(4)

3.2



F_N ✓ Normal force / Normale krag

✓ (Drawing of a free body diagram/Tekening van 'n vry-liggaamdiagram)

F_g ✓ Gravitational force / Gravitasiëkrag

(3)

3.3 3.3.1 Frictional force is when two surfaces are touching one of them moves a friction force is created ✓✓/Wrywingskrag is wanneer twee oppervlakte mekaar raak, een van hulle beweeg en wrywingkrag word gevorm ✓✓

OR/OF

Force parallel to the surface that opposes the motion of an object and acts in the direction opposite to the motion of the object. ✓✓/Krag wat parallel is aan die oppervlakte wat teen beweging van 'n voorwerp is en tree op in die teenoorgestelde rigting van beweging. ✓✓

(2)

3.3.2 Equilibrium of forces acting on the object are in balance./
Ekwilibrium van kragte wat inwerk op 'n voorwerp is in balans ✓✓
OR/OF

When all the forces acting on the object are in balance/✓✓
Wanneer al die kragte op die voorwerp inwerk, in balans is. ✓✓ (2)

3.4 $F_R = \text{Force/Krag A} + \text{Force/Krag B}$ ✓

$\text{Force/Krag A} + \text{Force/Krag B}$

$= 60 + (-50)$ ✓

$= 10 \text{ N upwards / opwaarts}$ ✓ (3)

3.5 Force of gravity **OR** Gravitational Force **OR** Weight ✓/

Swaartekrag OF Gravitatiekrag OF Gewig ✓ (1)
[15]

QUESTION/VRAAG 4

- 4.1 Mechanical advantage is the total energy possessed by an object because of its motion and its position. ✓✓/ *Meganiese voordeel is die totale energie wat 'n voorwerp besit as gevolg van sy beweging en sy posisie.* ✓✓

OR/OF

Ratio of load to effort ✓✓/ *Verhouding van las tot krag* (2)

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

Take moment about RL / Neem moment om RL

$$ACWM = CWM / AKWM = KWM$$

$$RR \times 8 \checkmark = (4 \times 2) + (5 \times 4) + (3 \times 6) \checkmark$$

$$RR = \frac{8+20+18}{8} \checkmark$$

$$RR = 5,75 \text{ N} \checkmark$$

Take moment about RR/ Neem moment om RR

$$CWM = ACWM / KWM = AKWM$$

$$(RL \times 8) \checkmark = (3 \times 2) + (5 \times 4) + (3 \times 6) \checkmark$$

$$RL = \frac{6 + 20 + 24}{8} \checkmark$$

$$RL = 6,25 \text{ N} \checkmark \quad (8)$$

- 4.3 Upward Forces = Downward Forces / *Opwaartse kragte = afwaartse kragte*

$$5,75 + 6,25 = 4 + 5 + 3 \checkmark$$

$$12 \text{ N} = 12 \text{ N} \checkmark \quad (2)$$

4.4 4.4.1 Moment of force is the turning effect of the force around that point. ✓✓ / *Moment van krag is die draaieffek van die krag om 'n punt.* ✓✓ (2)

4.4.2 Tension force is a pulling/stretching force / *Spanningskrag is die trek/rekkrag.* ✓✓

OR/OF

It causes the object on which it acts to tend to stretch. ✓✓ / *Dit veroorsaak dat die voorwerp waarop dit inwerk om te rek.* ✓✓

4.5 $F = 300 \text{ N}$, $r = 25 \text{ cm} = \frac{25}{100} = 0,25 \text{ m}$ ✓

$$\tau = F \times r \quad \checkmark$$

$$\tau = 300 \times 25 \quad \checkmark$$

$$\tau = 7500 \text{ N.m} \quad \checkmark \quad (4)$$

4.6 4.6.1 Class lever 2 / type 2 ✓✓ / *Klas hefboom 2 / tipe 2* (2)

4.6.2 $M = ?$ $F = 10,5 \text{ N}$ $d = 2,5 \text{ m}$

$$M = F \times d \quad \checkmark$$

$$M = 10,5 \times 2,5 \quad \checkmark$$

$$M = 26,25 \text{ N anti-clockwise} / \textit{antikloksgewys} \quad \checkmark \quad (3)$$

[25]

QUESTION/VRAAG 5

5.1 Gravitational potential energy is the energy it has because of its position, ✓✓ while kinetic energy is the energy of an object due to its motion. ✓✓ / *Gravitasie potensiële energie is die energie as gevolg van sy posisie, ✓ waar kinetiese energie die energie van 'n voorwerp as gevolg van sy beweging is. ✓✓* (4)

5.2 5.2.1 $E_k = \frac{1}{2} mv^2$ ✓
 $= \frac{1}{2} \times 50 \times 6^2$ ✓
 $= 900 \text{ J}$ ✓ (3)

5.2.2 $E_p = mgh$ ✓
 $= 50 \times 9,8 \times 5$ ✓
 $= 2\,450 \text{ J}$ ✓ (3)

5.3 $E_p = mgh$
 $h = \frac{E_p}{mg}$ ✓ $h = \frac{506}{(50)(9,8)}$ ✓
 $h = 1,032 \text{ m}$ ✓

OR/OF

$E_p = mgh$ ✓
 $506 = 50 \times 9,8 \times h$ ✓
 $h = 1,032 \text{ m}$ ✓ (3)

5.4 Energy of translation motion/*Energie van translasiebeweging* ✓
 Energy of vibrational motion/*Energie van vibrasiebeweging* ✓
 Energy of rotational motion/*Energie van rotasiebeweging* ✓ (3)

[16]

QUESTION/VRAAG 6

- 6.1 Pushing force / *stootkrag* ✓ (1)
- 6.2 6.2.1 Repulsive force / *Afstotende krag* ✓ (1)
- 6.2.2 Positively charged / *Positief gelaai* ✓ (1)
- 6.3 6.3.1 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)
- 6.3.2 $Q_T = \frac{Q_1 + Q_2}{2}$ ✓
- $$Q_T = \frac{10 \times 10^{-9} + (-8 \times 10^{-9})}{2} \checkmark$$
- $$= 1 \times 10^{-9} \text{C} \checkmark \quad (3)$$
- 6.3.3 $N = \frac{\text{Charge}}{\text{electron charge}} / \frac{\text{lading}}{\text{elektron lading}} \checkmark$
- $$= \frac{(8 \times 10^{-9})}{1,6 \times 10^{-19}} \checkmark$$
- $$= 5 \times 10^{10} \checkmark \quad (3)$$
- 6.3.4 X and Y, has an excess of electrons ✓ / *X en Y het oormaat van elektrone* ✓ (2)

[13]

QUESTION/VRAAG 7

7.1 7.1.1 Electric current is the rate at which the electric charge flow. ✓✓ / *Elektriese stroom is die tempo waarteen elektriese lading vloei.* ✓✓ (2)

7.1.2 Resistance is the opposition to electric flow. ✓✓ / *Weerstand is die teenstand van elektriese vloei.* ✓✓ (2)

7.2 Temperature ✓ / *Temperatuur* ✓
 Size of the conductor ✓ / *Grootte van die geleier* ✓
 The length of the conductor ✓ / *Die lengte van die geleier* ✓
 Material from which the conductor is made ✓ / *Materiaal waarvan die geleier gemaak is* ✓ (4)

7.3 Split into two directions / *Verdeel in twee rigtings* ✓ (1)

$$7.4 \quad R_p = \frac{R_1 \times R_2}{R_1 + R_2} \checkmark$$

$$= \frac{10 \times 10}{10 + 10} \checkmark$$

$$\therefore R_T = 5 + 10 \checkmark$$

$$= 15 \Omega \checkmark$$

OR/OF

$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + R_3 \checkmark$$

$$= \left(\frac{1}{10} + \frac{1}{10} \right) \checkmark + 10 \checkmark$$

$$R_t = \frac{10}{2} + 10$$

$$= 15 \Omega \checkmark$$

(4)
[13]

QUESTION/VRAAG 8

- 8.1 A – Ammeter ✓
B – Voltmeter ✓ (2)
- 8.2 The reading is the same ✓ / *Die lesing is dieselfde* ✓ (1)
- 8.3 $V_t = V_{b1} + 4\text{ V}$ ✓
 $\therefore V_{b1} = V_t - 4$
 $= 10 - 4$ ✓
 $= 6\text{ V}$ ✓ (3)
- 8.4 Source / battery / ✓ *Kragbron / Battery* ✓
Conductor / ✓ *Geleier* ✓
Controlling device / ✓ *Gekontroleerde toestel* ✓
Load ✓ / *Las* ✓ (4)
- 8.5 AC is an electric current which periodical reverses direction ✓ and DC-current which flows only in one direction. ✓ / *AF is 'n elektriese stroom wat van tyd tot tyd rigting omkeer en GS-stroom is wat slegs in een rigting vloei.* (2)
- 8.6 $Q = 2\text{C}$, $t = 0,4\text{s}$ and $I = ?$
 $I = \frac{Q}{\Delta t}$ ✓
 $= \frac{2}{0,4}$ ✓
 $= 5\text{ A}$ ✓ (3)

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