Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 11

NOVEMBER 2020

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

MARKS/*PUNTE:* **150**

This marking guideline consists of 10 pages./
Hierdie nasienriglyn bestaan uit 10 bladsye.

QUESTION/*VRAAG* 1

1.1	D	✓✓	(2)
1.2	B	✓✓	(2)
1.3	C	✓✓	(2)
1.4	A	✓✓	(2)
1.5	B	✓✓	(2)
1.6	B	✓✓	(2)
1.7	C	✓✓	(2)
1.8	C	✓✓	(2)
1.9	A	✓✓	(2)
1.10	C	✓✓	(2)

[20]

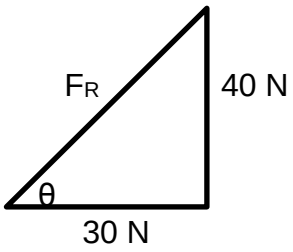
QUESTION/*VRAAG* 2

2.1 A single vector which has the same effect as other vectors put together./*'n Enkele vektor wat dieselfde effek as al die ander vektore saam het.* ✓✓ (2)

2.2 F_1 and/*en* F_2 ✓✓ (2)

2.3 Take East as Positive / *Neem Oos as positief.*
F_{R1} = (50) + (-20) ✓
= 30 N east/*oos* ✓ (2)

2.4 $F_R^2 = F_3^2 + F_{R1}^2$ ✓
$= (40)^2 + (30)^2$ ✓
= 50 N ✓



Tan θ = $\frac{40}{30}$ ✓
∴ θ = 53,13° ✓ (5)

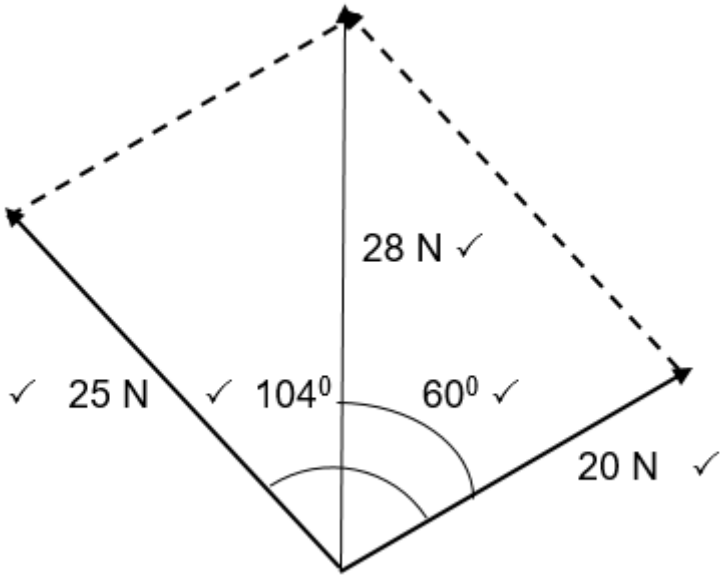
2.5 40 N ✓ North/*Noord* ✓ (2)

[13]

QUESTION/*VRAAG* 3

3.1 If two forces acting at a point can be represented by the adjacent sides of a parallelogram both in magnitude and direction, then the diagonal from the point gives the resultant of the two forces. ✓✓ /
As die grootte en rigting van twee kragte wat by 'n punt uitgeoefen word deur die aangrensende sye van 'n parallelogram voorgestel word, gee die diagonaal vanaf daardie punt die resultant van die twee kragte. ✓✓ (2)

3.2



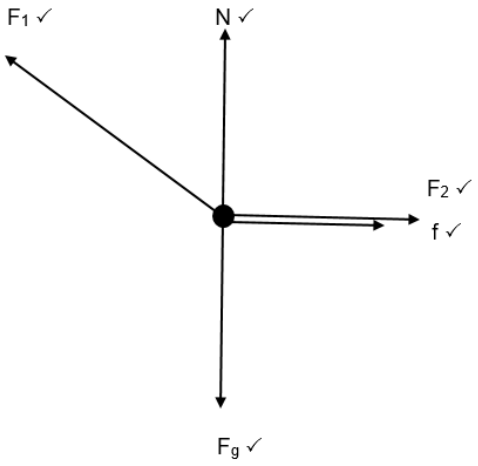
Resultant = 28 N (accept 27 N to 29 N) at an angle 60° (Accept 59° to 61°) with the 20 N force ✓
Resultant = 28 N (Aanvaar 27 N tot 29 N) teen 'n hoek van 60° (Aanvaar 59° tot 61°) hoek met die 20 N krag ✓ (6)
[8]

QUESTION/*VRAAG* 4

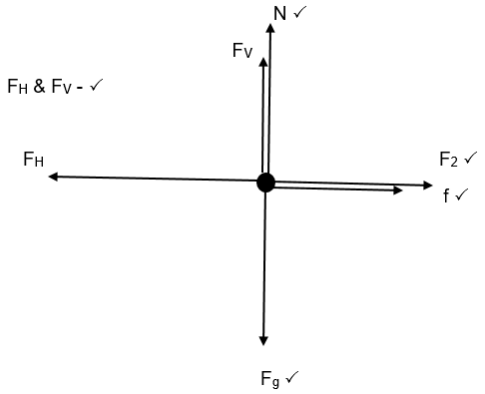
4.1 4.1.1 $F_H = F \cos \theta$ ✓
$= (40)(\cos 35°)$ ✓
$= 32,77$ N ✓ (3)

4.1.2 Kinetic frictional force acts between objects in motion.
Kinetiese wrywingskrag werk tussen bewegende voowerpe. ✓✓ (2)

4.1.3 **OPTION/*OPSIE* 1**



OPTION/*OPSIE* 2



(5)

4.1.4 $f_k = \mu_k N$ ✓
$f_k = (0,38)(F_g - F_v)$
$= (0,38)[(10)(9,8) - (40)(\sin 35°)]$ ✓
$= 28,52$ N ✓
$F_2 + f = F_H$ ✓ (constant velocity/*konstante snelheid*)
$F_2 + 28,52 = 32,77$
$F_2 = 4,25$ N ✓ (5)

4.2 Remains the same/*Bly dieselfde* ✓ (1)

4.3 $f_s = \mu_s N$ ✓
$f_s = (0,6)[(20)(9,8)]$ ✓
$f_s = 117,6$ N ✓
$F_{Applied} > f_s$ ✓
Block will ACCELERATE / *Blok sal VERSNEL* ✓ (5)
[21]

QUESTION/*VRAAG* 5

5.1 A wave motion in which particles of the medium vibrate perpendicular to the direction of propagation of the wave. ✓✓
'n Golfbeweging waarin deeltjies van die medium loodreg tot die rigting van voorplanting van die golf beweeg. ✓✓ (2)

5.2 b and/en f ✓
a and/en d ✓ (2)

5.3 15 cm ✓✓ (2)

5.4 $f = \frac{1}{T}$ ✓
$= \frac{1}{0,02}$ ✓
= 50 Hz ✓ (3)

5.5 $v = f\lambda$ ✓
$20 = (50)\ \lambda$
$\lambda = 0,4$ m ✓
$D = 2\lambda$
$D = (2)(0,4)$ ✓
D = 0,8 m ✓ (4)
[13]

QUESTION/*VRAAG* 6

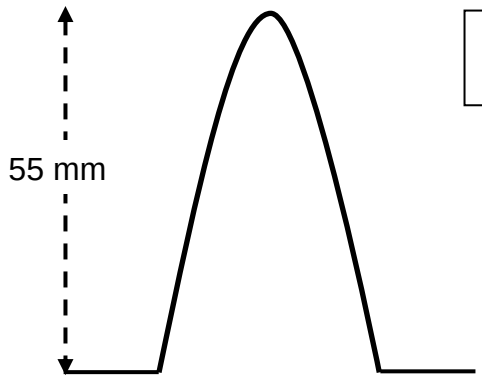
6.1 6.1.1 Pitch is a measure of high or low a note is. ✓✓
Toonhoogte is die maatstaf van hoe hoog of laag 'n noot is. ✓✓ (2)

6.1.2 B ✓
Number of waves per second is higher in B than A. ✓✓
Aantal golwe per sekonde is hoër in B as in A. ✓✓ (3)

6.1.3 A ✓ (1)

6.2 6.2.1 The superposition of two waves which are in phase. ✓✓
Die superposisie van twee golwe wat in fase is. ✓✓ (2)

6.2.2



Shape / *Vorm* ✓
Amplitude = 55 mm ✓✓

(3)

6.3 6.3.1 Longitudinal / *Longitudinaal* ✓ (1)

6.3.2 $v = \frac{D}{t}$ ✓
340 ✓ $= \frac{2D}{2,02}$ ✓ **OR/*OF*** 340 ✓ $= \frac{D}{1,01}$ ✓
D = 343,4 m ✓ (4)

[16]

QUESTION/*VRAAG* 7

7.1 7.1.1 Number of waves pass through a point per second. ✓✓
Aantal golwe wat per sekonde by 'n punt verbybeweeg. ✓✓ (2)

7.1.2 Gradient: $m = \frac{y_2 - y_1}{x_2 - x_1}$ ✓

$m = \frac{6-3}{18\times10^{-3} - 9\times10^{-3}}$ ✓✓

$m = 333{,}33$

∴ Speed/*Spoed* = 333,33 $m.s^{-1}$ ✓ (4)

7.1.3 Medium 2 ✓
Gradient for medium 2 is higher ✓
Gradiënt vir Medium 2 is hoër. ✓ (2)

7.2 7.2.1 **A** ✓ (1)

7.2.2 **B** ✓ (1)

7.2.3 **C** ✓ (1)

7.2.4 Any TWO / *Enige TWEE:*

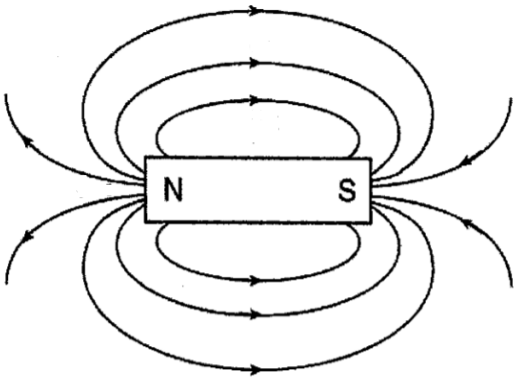
- To detect invisible flaws in material and welded joints
  Om onsigbare defekte in materiale en sweislasse na te speur.
- To measure the thickness of objects
  Om die dikte van voorwerpe te meet.
- Used in automatic door openers
  Word gebruik in outomatiese deuroopmakers.
- Ultrasonic flowmeters to measure the flow in pipes and open channels
  Ultrasoniese vloeimeters meet die vloei in pype en oop kanale. (2)

[13]

QUESTION/*VRAAG* 8

8.1 *8.1.1* A region in space where a magnetic material experiences a force. ✓✓
'n Gebied in die ruimte waar 'n magnetiese materiaal 'n krag sal ondervind. ✓✓ (2)

8.1.2



Shape/*Vorm* ✓
Direction/*Rigting* ✓
Lines closer at poles/*Lyne nader by pole* ✓

(3)

8.2 8.2.1 Attractive ✓ Unlike poles attract ✓
Aantrekkend ✓Teenoorgestelde pole trek mekaar aan ✓ (2)

8.2.2 As the distance increases the force of attraction decreases. ✓✓
Soos die afstand toeneem, neem die aantrekkende krag af. ✓✓ (2)

8.3 Large bubble of protons and elctrons ejected by sun travels towards the Earth and then join up with Earth's magnetic field, resulting in a large amount of energy being released into the Earth's atmosphere, causing geomagnetic storms. ✓✓
'n Groot bol protone en elektrone word deur die son uitgewerp en beweeg na die Aarde en sluit aan by die Aarde se magnetiese veld, wat daartoe lei dat 'n groot hoeveelheid energie in die Aarde se atmosfeer vrygestel word en dit veroorsaak geomagnetiese storms. ✓✓ (2)

[11]

QUESTION/*VRAAG* 9

9.1 9.1.1 The force of attraction or repulsion between two point charge is directly proportional to the product of (quantity of) the charges and inversely proportional to the square of the distance between their centres. ✓✓
Die aantrekkings- of afstotingskrag tussen twee puntladings is direk eweredig aan die produk (van die grootte) van die ladings en omgekeerd eweredig aan die kwadraat van die afstand tussen hulle middelpunte. ✓✓ (2)

9.1.2 $F = \frac{kQ_1Q_2}{r^2}$ ✓
$6\,480 = \frac{9\times10^9 \times 2q\times4q}{(0,02)^2}$ ✓✓
$q^2 = 36 \times 10^{-12}$
$q = 6 \times 10^{-6}$ C ✓ (4)

9.2 9.2.1 A region in space where an electric charge experiences a force. ✓✓
'n Gebied in die ruimte waar elektriese lading 'n krag sal ondervind. ✓✓ (2)

9.2.2 TOWARDS **Y** / *NA* ***Y*** ✓ (1)

9.2.3
$F = Eq$ ✓
$0,21 = E\,(6\times10^{-6})$ ✓
$E = 35000$ N.C^{-1}
$E = \frac{V}{d}$ ✓
$35000 = \frac{V}{0,01}$ ✓
$\therefore V = 350$ V ✓

OR/*OF*

$E = \frac{F}{q}$ ✓
$E = \frac{V}{d}$ ✓
$\frac{F}{q} = \frac{V}{d}$
$\frac{0,21}{6\times10^{-6}} = \frac{V}{0,01}$ ✓✓
$\therefore V = 350$ V ✓ (5)

[14]

QUESTION/*VRAAG* 10

10.1 10.1.1 The current in a conductor is directly proportional to the potential difference across it when temperature remains constant. ✓✓
Die stroom in 'n geleier is direk eweredig aan die potensiaalverskil oor die geleier indien die temperatuur konstant bly. ✓✓ (2)

10.1.2 $V = IR$ ✓
$24 = (0,89)(R_T)$ ✓
$R_T = 27,33\ \Omega$ ✓ (3)

10.1.3 $R_T = 12 + R_{//} + 12$ ✓
$27,33 = 24 + R_{//}$
$R_{//} = 3,33\ \Omega$ ✓
$\frac{1}{R_{//}} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓ **OR/OF** $R_p = R_1.R_2/(R_1 + R_2)$
$\frac{1}{3,33} = \frac{1}{10} + \frac{1}{R}$ ✓ $= 3,33 \times 10/(3,33 + 10)$
$R = 4,99\ \Omega$ ✓ (5)

10.2 0 V ✓ (1)

10.3 24 J ✓ (1)

10.4 Decreases / *Verminder* ✓
Total resistance of the circuit increases. Total current decreases.
Totale weerstand van die stroombaan neem toe. Die totale stroom verminder. ✓✓ (3)

10.5 10.5.1 Resistance offered by a cell when a current flows through it. ✓✓
Die weerstand veroorsaak deur die sel wanneer 'n stroom daardeur vloei. ✓✓ (2)

10.5.2 12 V ✓ (1)

10.5.3 Decreases / *Verminder* ✓
When S is closed, current flows through the external circuit and the battery. ✓ A potential is developed across the internal resistor which is called 'lost volt'. ✓ Energy lost inside the cell due to internal resistance is less than the initial energy. ✓
Wanneer S gesluit word, vloei die stroom deur die eksterne stroombaan en die battery. ✓ *'n Potensiaal word oor die interne weerstand gevorm en word 'verlore volt' genoem.* ✓ *Die energie wat in die sel verlore gaan as gevolg van interne weerstand is minder as die aanvanklike energie.* ✓ 3

[21]

TOTAL/*TOTAAL*: 150