



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL SENIOR CERTIFICATE/
NASIONALE SENIOR SERTIFIKAAT**

GRADE/GRAAD 11

NOVEMBER 2018

**TECHNICAL SCIENCES P2/TEGNIESE WETENSKAPPE V2
MARKING GUIDELINE/NASIENRIGLYN**

MARKS/PUNTE: 150

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

QUESTION/VRAAG 1

- 1.1 A ✓✓ (2)
 1.2 B ✓✓ (2)
 1.3 C ✓✓ (2)
 1.4 A ✓✓ (2)
 1.5 C ✓✓ (2)
 1.6 D ✓✓ (2)
 1.7 B ✓✓ (2)
 1.8 D ✓✓ (2)
 1.9 B ✓✓ (2)
 1.10 A ✓✓ (2)
- [20]**

QUESTION/VRAAG 2

- 2.1 A substance that gains electrons ✓✓ / Substance that is reduced (2)
'n Stof was elektrone ontvang / Stof wat gereduseer word
- 2.2 2.2.1 + 4 ✓✓ (2)
 2.2.2 Cl⁻ ✓
- Oxidation number (of chlorine) increases from -1 to 0 ✓✓
Oksidasiegetal (van chloor) vermeerder van -1 na 0 (3)
- 2.3 Oxygen/Suurstof ✓ (1)
- [8]**

QUESTION/VRAAG 3

- 3.1 Process of producing a chemical change using electrical energy ✓✓
OR Decomposition of a compound by using electricity (2)
Proses waarby 'n chemiese verandering plaasvind deur elektriese energie te gebruik ✓✓
OF *Ontbinding van 'n verbinding deur elektrisiteit te gebruik*
- 3.2.1 Brown deposit/Bruin neerslag ✓
- Cu²⁺ ion is reduced ✓ (to Cu) / Cu²⁺-ioon is gereduseer ✓ (na Cu) (2)
- 3.2.2 Colour of solution loses its intensity ✓ / (1)
Kleur van oplossing verloor sy intensiteit
- 3.3 **B** ✓
- Positive electrode ✓✓ **OR** Oxidation takes place at the anode (3)
Positiewe elektrode OF Oksidasie vind by die anode plaas ✓✓

- 3.4 3.4.1 Battery ✓ (1)
- 3.4.2 Carbon/*Koolstof* ✓ (1)
- 3.5 To set ions free to move/*Om ione vry te stel om te beweeg* ✓✓ (2)
- 3.6 3.6.1 Cu^{2+} or Copper(II) ion / *Cu⁺² of Koper(II)ion* ✓✓ (2)
- 3.6.2 $2 \text{Cl}^- \longrightarrow \text{Cl}_2 + 2\text{e}^-$ ✓✓ (2)
- 3.6.3 $\text{Cu}^{2+} + 2\text{Cl}^- \longrightarrow \text{Cu} + \text{Cl}_2$ ✓✓✓ (3)
- 3.7 Replace electrode with the iron ring ✓✓
 Replace electrode B with copper ✓✓
Vervang elektrode met die ysterring ✓✓
Vervang elektrode B met koper ✓✓ (4)
- [23]**

QUESTION/VRAAG 4

- 4.1 Specific heat capacity is the amount of heat required to increase the temperature of 1 kg of the substance by 1 °C or by 1 K. ✓✓
Spesifieke warmtekapasiteit is die hoeveelheid warmte nodig om die temperatuur van 1 kg van 'n stof met 1 °C of 1 K te verhoog. ✓✓ (2)
- 4.2 4.2.1 $Q = c m \Delta T$ ✓
 $= 4\,200 \times 0,25 (100 - 25)$ ✓
 $= 78\,750 \text{ J}$ ✓
 78 750 J is needed to boil the water/*word benodig om die water te kook* (3)
- 4.2.2 $Q = c m \Delta T$
 $= 500 \times 0,2 (75)$ ✓
 $= 7\,500 \text{ J}$ ✓
 7 500 J of heat needed to increase the temperature of the stainless-steel pot. / *7 500 J van die warmte is nodig om die temperatuur van die vlekvrystaal te verhoog.* (2)
- 4.3 Expansion joints allow the bridge to expand in summer / when hot and contract in winter/ when cold. ✓✓
Die uitsetting van voë (joints) veroorsaak dat die brug uitsit in die somer (in hitte) en krimp in die winter (in koue). ✓✓ (2)
- [9]**

QUESTION/VRAAG 5

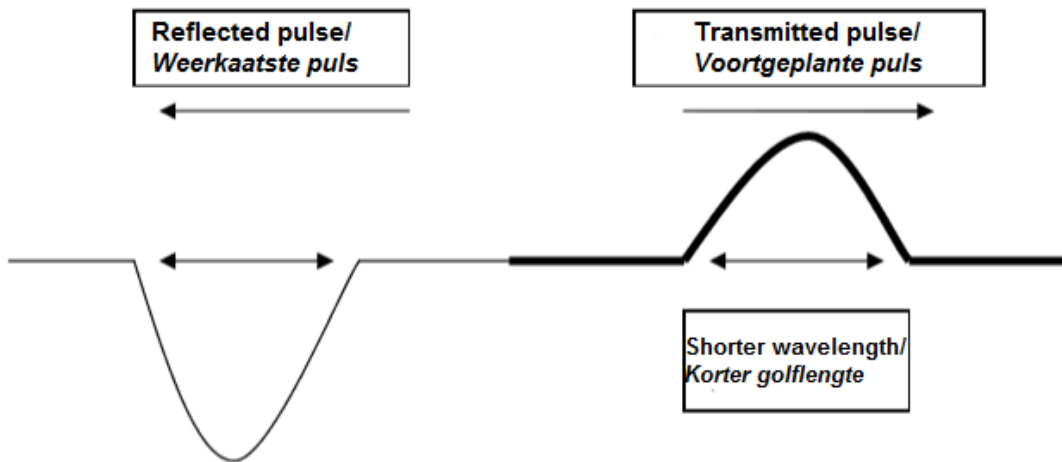
- 5.1 Law of conservation of heat states that the amount of heat lost equals the amount of heat gained, when no heat is lost. ✓✓
Die wet van die behoud van warmte stel dat die hoeveelheid warmte uitgegee gelyk is aan die hoeveelheid warmte opgeneem waar daar geen warmte verlore gaan nie. ✓✓ (2)
- 5.2 Heat/Warmte ✓ (1)
- 5.3 5.3.1 Energy is transferred to the ice/*Energie oorgedra na die ys.* ✓✓ (2)
- 5.3.2 $Q_{\text{net}} = 0$ ✓
 $Q_1 + Q_2 = 0$
 Therefore/*Dus*
 Q gained by cool water = Q lost by warm water
 Q *gewen deur koue water* = Q *verloor deur warm water*
 $c m_1 \Delta T = - c m_2 \Delta T$ ✓
 $c (105) (T_{\text{final}} - 20 \text{ }^\circ\text{C})$ ✓ = - $c (80) (T_{\text{final}} - 35 \text{ }^\circ\text{C})$ ✓
 $185 T_{\text{final}} = 4\ 900$
 $T_{\text{final}} = 26,49 \text{ }^\circ\text{C}$ ✓ (5)
- 5.4 5.4.1 The first law of thermodynamics states that if heat energy is given to a system, it is used in increasing the internal energy of the system and doing work against external pressure. ✓✓
Die eerste wet van termodinamika wanneer warmte-energie aan 'n sisteem oorgedra word, neem die energie van die sisteem toe en arbeid word verrig deur die eksterne druk. ✓✓ (2)
- 5.4.2 $Q = \Delta U + W$ ✓
 $= 2 + 10$ ✓
 $= 12 \text{ J}$ ✓ (3)
- 5.5 5.5.1 Working substance is a substance that absorbs heat from the source to execute a thermodynamic process e.g. air in petrol and diesel engines. ✓✓
Werkstof is die stof wat die warmte uit 'n bron absorbeer om 'n termodinamiese proses uit te voer bv lug in petrol- en diesel-enjins. ✓✓ (2)
- 5.5.2 Heat energy is converted into mechanical energy. ✓✓
Warmte-energie is na meganiese energie omgesit. ✓✓ (2)
- 5.5.3 An efficient engine is where the heat energy that is lost ✓ to the sink or the environment is a minimum. ✓
'n Doeltreffende enjin is een waar die warmte-energie wat verlore gaan ✓ na die verspreider of na die omgewing, 'n minimum is. ✓ (2)
- 5.6 System not closed/*Sisteem is nie-geslote nie.* ✓✓ (2)

[23]

QUESTION/VRAAG 6

- 6.1 Pulse is a single disturbance in a medium ✓✓
'n Puls is 'n enkele versteuring in 'n medium ✓✓ (2)
- 6.2 6.2.1 Succession of pulses/*Opeenvolgende pulse* ✓✓ (2)
- 6.2.2 Longitudinal wave/*Longitudinale golf* ✓ (1)
- 6.2.3 (a) **X**: Rarefaction/*Verdunning* ✓ (1)
- (b) **Y**: Compression/*Verdigting* ✓ (1)
- 6.2.4 $v = f\lambda$ ✓
 $343 = f \times 3/100$ ✓
 $f = 11\,433\text{ Hz}$ ✓
Sound is not infrasound: $f > 20\text{ Hz}$ ✓
Klank is nie infraklank nie: $f > 20\text{ Hz}$ (4)
- 6.3 6.3.1 P and/en Q ✓ (1)
- 6.3.2 DOWNWARDS/*AFWAARTS* ✓ (1)
- 6.3.3 Amplitude ✓ (1)
- 6.3.4 $f = 1/T$ ✓
 $f = 1/0,2$ ✓
 $f = 5\text{ Hz}$ ✓ (3)

6.4



Drawing of transmitted pulse / <i>Teken van voortgeplante puls</i>	✓
Drawing of reflected pulse / <i>Teken van weerkaatste puls</i>	✓
Label of transmitted pulse / <i>Byskrif van voortgeplante puls</i>	✓

(3)
[20]

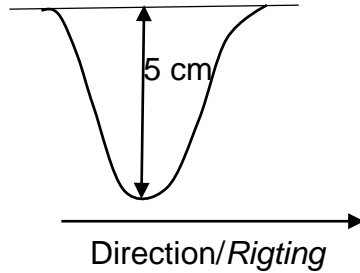
QUESTION/VRAAG 7

7.1 7.1.1 Two waves meet each other when traveling in the same medium. ✓✓
Twee golwe ontmoet mekaar wanneer hulle in dieselfde medium beweeg. ✓✓ (2)

7.1.2 (a) Constructive interference/*Konstruktiewe interferensie* ✓ (1)

(b) Destructive interference/*Destruktiewe interferensie* ✓ (1)

7.1.3 a.



Shape of the pulse	<i>Vorm van die puls</i>	✓
Amplitude	<i>Amplitude</i>	✓
Direction	<i>Rigting</i>	✓

(3)

7.2 7.2.1 **A** ✓ Higher amplitude/*Hoër amplitude* ✓✓ (3)

7.2.2 **B** ✓ Higher frequency/*Hoër frekwensie* ✓✓ (3)

7.3 7.3.1 No/*Nee* ✓ (1)

7.3.2 $V = d/\Delta t$ ✓

$$343 \checkmark = d/0,18 \checkmark$$

$$d = 61,74 \text{ m} \checkmark$$

(4)

[18]

QUESTION/VRAAG 8

- 8.1 8.1.1 0,15 s ✓✓ (2)
- 8.1.2 Gradient/*Gradiënt* = $\Delta V/\Delta t$
 = $(70 - 35) / (0,2 - 0,1)$ ✓
 = $350 \text{ m}\cdot\text{s}^{-1}$ ✓ (3)
- 8.2.1 Speed (of sound)/*Spoed (van klank)* ✓ (1)
- 8.2.2 Distance is directly proportional to the time taken ✓✓
Afstand is direk eweredig aan die tyd geneem ✓✓ (2)
- 8.3.1 REMAINS THE SAME ✓ $f \propto 1/\lambda$ ✓ (so v remains constant)
BLY DIESELFDE ✓ $f \propto 1/\lambda$ ✓ (so v bly dieselfde) (3)
- 8.3.2 REMAINS THE SAME ✓ speed is constant ✓✓
BLY DIESELFDE ✓ *Spoed is konstant* ✓✓ (3)
- 8.4 Sound waves/Seismic waves/Earthquake (Any 2) ✓✓
Klankgolwe/Seismiese golwe/Aardbewings (Enige 2) ✓✓ (2)
- [16]**

QUESTION/VRAAG 9

- 9.1 Dogs ✓/Dolphins ✓/Bats ✓
Honde ✓ / Dolfyne ✓ / Vlermuise ✓ (3)
- 9.2 9.2.1 Infrasound/*Infraklank* ✓ (1)
- 9.2.2 Elephants//*Olifante* ✓
 Can detect the lowest frequencies ✓
Kan die laagste frekwensies waarneem ✓ (2)
- 9.3 9.3.1 Monitor earthquakes/*Monitor aardbewings* ✓
 Detect volcanic eruptions/*Spoor vulkaniese uitbarstings op* ✓ (2)
- 9.3.2 Used for echo location (by bats and dolphins) ✓
 Detect objects / Measure thickness of object ✓
Gebruik vir eggo-opsporing (deur vlermuise en dolfyne) ✓
Opsporing van voorwerpe / Meet dikte van 'n voorwerp ✓ (2)
- 9.4 $v = f\lambda$ ✓
 $343 = 150\,000 \lambda$ ✓
 $\lambda = 2,29 \times 10^{-3} \text{ m}$ ✓ (3)
- [13]**

TOTAL/TOTAAL: 150