

**NATIONAL
SENIOR CERTIFICATE
NASIONALE SENIOR
SERTIFIKAAT**

GRADE/GRAAD 10

NOVEMBER 2020

**PHYSICAL SCIENCES (PHYSICS) P1/
FISIESE WETENSKAPPE (FISIKA) V1
MARKING GUIDELINE/NASIENRIGLYN
(EXEMPLAR/EKSEMPLAAR)**

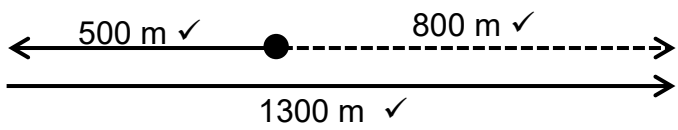
MARKS/PUNTE: 150

This marking guideline consists of 12 pages./
Hierdie nasienriglyn bestaan uit 12 bladsye.

QUESTION 1/VRAAG 1

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

QUESTION 2/VRAAG 2

- 2.1.1 The total distance travelled divided by total time ✓✓
Die totale afstand afgelê gedeel deur die totale tyd. (2)
- 2.1.2 $v = \Delta x / \Delta t$ ✓
 $= (500 + 800) / 1\ 800$ ✓
 $= 0,72 \text{ m}\cdot\text{s}^{-1}$ ✓ (3)
- 2.1.3  (3)
- 2.1.4 $v = \Delta x / \Delta t$ ✓
 $0,72 \text{ ✓} = (500 + 500 + 1\ 300) / \Delta t$ ✓
 $\Delta t = 3\ 194,44 \text{ s}$ ✓ (4)
- 2.2.1 Distance/*Afstand* = $\frac{1}{2} \times 2\pi r$ ✓ = $\frac{1}{2} \times 2 \times \pi \times 25 = 78,57 \text{ m}$ ✓✓ (3)
- 2.2.2 Displacement/*Verplasing* = $2 \times \text{radius} = 50 \text{ m}$ ✓ East/*Oos* ✓ (2)
- [17]**

QUESTION 3/VRAAG 3

3.1 The rate of change of velocity ✓✓
Die tempo van verandering van snelheid (2)

3.2 $54 \text{ km.h}^{-1} = \frac{54}{3.6} \checkmark\checkmark$
 $= 15 \text{ m.s}^{-1} \checkmark$ (3)

3.3 $v_f = v_i + a\Delta t \checkmark$
 $20 \checkmark = 0 + 2t \checkmark$
 $\Delta t = 10 \text{ s} \checkmark$ (4)

3.4 Police car / *polisie-motor*: $\Delta x = v_i\Delta t + \frac{1}{2}at^2 \checkmark$
 $= (0)(10) + \frac{1}{2}(2)(10)^2 \checkmark$
 $\Delta x = 100 \text{ m} \checkmark$

Van/ *bakkie*: $\Delta x = v_i\Delta t + \frac{1}{2}at^2$
 $= (15)(10) + \frac{1}{2}(0)(10)^2 \checkmark$

$\Delta x = 150 \text{ m} \checkmark$
The van is ahead/*Die bakkie is voor.* ✓ (6)
[15]

QUESTION 4/VRAAG 4

- 4.1.1 $5 \text{ m}\cdot\text{s}^{-1}$ ✓ EAST / OOS ✓ (2)
- 4.1.2 $8.4 \text{ m}\cdot\text{s}^{-1}$ ✓✓ (Accept 8,2 to 8,6 $\text{m}\cdot\text{s}^{-1}$) (2)
- 4.2 4.2.1 The velocity is uniformly increasing / *Die snelheid verhoog eenvormig* ✓
Positive acceleration / *Positiewe versnelling* ✓ (2)
- 4.2.2 Constant velocity / *Konstante snelheid* ✓✓ **OR/ OF** acceleration is equal to zero / *Versnelling is gelyk aan nul*
No acceleration / *Geen versnelling* (2)
- 4.3 4.3.1 Distance **A** to **C** / *Afstand vanaf A na C.*
- $$\Delta x = (l \times b) + (1/2 bh) \quad \checkmark$$
- $$\Delta x = (5 \times 350) \checkmark + (1/2 \times 150 \times 5) \checkmark$$
- $$\Delta x = 2\,125 \text{ m} \quad \checkmark \quad (4)$$
- 4.3.2 $a = (v_f - v_i)/\Delta t$
- $$= (0 - 10)/50 \quad \checkmark \checkmark$$
- $$= -0,2 \quad \checkmark$$
- $$a = 0,2 \text{ m}\cdot\text{s}^{-2} \quad \text{west / wes} \quad \checkmark \quad (4)$$
- 4.4 Gradient/slope is the steepest / *Gradiënt/helling is die steilste.* ✓✓ (2)
- [18]**

QUESTION 5/VRAAG 5

5.1 The total mechanical energy in an isolated system is constant ✓✓
Die totale meganiese energie in 'n geïsoleerde sisteem bly konstant. (2)

5.2 0 (J) ✓ (2)

5.3 490 (J) ✓

5.4 $E_p = mgh$ ✓
 $= 5 \times 9,8 \times 6$ ✓
 $= 294 \text{ J}$ ✓ (3)

5.2.2 $(\frac{1}{2}mv^2 + mgh)_A = (\frac{1}{2}mv^2 + mgh)_D$ ✓

$$490 \checkmark = \frac{1}{2}(5)v^2 \checkmark + (5)(9,8)(10) \checkmark$$

$$v = 0 \checkmark$$

The ball will reach point **D** / *Die bal sal punt **D** bereik.* ✓ (5)
[12]

QUESTION 6/VRAAG 6

6.1.1 $f = 1/T$ ✓
 $= 1/0,2$ ✓
 $= 5 \text{ Hz}$ ✓ (3)

6.1.2 $v = f\lambda$ ✓
 $= 5$ ✓ $\times 3/2$ ✓
 $= 7,5 \text{ m}\cdot\text{s}^{-1}$ ✓ (4)

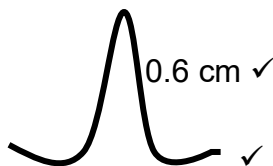
6.1.3 a and / en d ✓ b and / en f ✓ (2)

6.1.4 Amplitude = $30/2 = 15 \text{ m}$ ✓✓ (2)

6.2.1 Pulse – single disturbance in a medium ✓✓
Puls – Enkele versteuring in 'n medium (2)

6.2.2 Destructive interference ✓
Destruktiwe interferensie (1)

6.2.3



(2)
[16]

QUESTION 7/VRAAG 7

- 7.1.1 A: rarefaction / *verdunning* ✓
 B: compression / *verdigting* ✓
 C: wavelength / *golflengte* ✓ (3)
- 7.1.2 Yes/ *Ja* ✓ (1)
- 7.2.1 B ✓
 Higher frequency / *Hoër frekwensie* ✓✓ (3)
- 7.2.2 A ✓ (1)
- [8]**

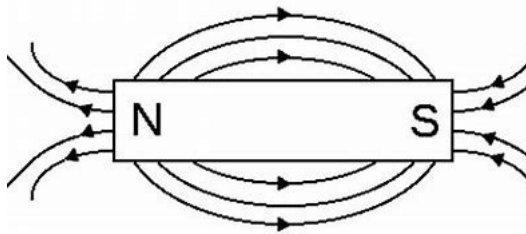
QUESTION 8 / VRAAG 8

- 8.1 It has both wave-like characteristics / *Dit het beide golfagtige eienskappe* ✓
 and particle-like characteristics / *en deeltjie-agtige eienskappe* ✓ (2)
- 8.2 Infrared, visible light, x-ray, gamma rays ✓✓
Infrarooi, sigbare lig, x-straal, gamma-straling (2)
- 8.3 A particle of light energy ✓✓
'n Deeltjie van ligenergie (2)
- 8.4
 $c = f \times \lambda$ ✓
 $3 \times 10^8 \text{ m/s} = f (0,025 \times 10^{-9} \text{ m})$ ✓
 $f = 1,2 \times 10^{19} \text{ Hz}$
 $E = hf$ ✓
 $E = (6,63 \times 10^{-34} \text{ J}\cdot\text{s}) (1,2 \times 10^{19} \text{ Hz})$ ✓
 $E = 7,95 \times 10^{-15} \text{ J}$ ✓ (6)
- [12]**

QUESTION 9/VRAAG 9

9.1 Is a region in space where magnetic substance can experience a force ✓✓
 Is 'n gebied in ruimte waar magnetiese stof 'n krag kan ervaar. (2)

9.2



Shape / Vorm ✓✓

Direction / Rigting ✓

(3)

9.3 No / Nee ✓ (1)
[6]

QUESTION 10/VRAAG 10

10.1.1 Less than / Minder as ✓ (1)

10.1.2 $n = Q / q_e$

$$10^{13} \checkmark = Q / -1,6 \times 10^{-19} \checkmark$$

$$Q = -1,6 \times 10^{-6} \text{ C}$$

$$Q_{\text{new}} = -1,6 \times 10^{-19} + 2 \times 10^{-19} = 4 \times 10^{-18} \text{ C} \quad (4)$$

10.2.1 The net charge of an isolated system remains constant. ✓✓
 Die netto lading van 'n geïsoleerde sisteem bly konstant. (2)

10.2.2 $Q_b = Q_c = Q_{\text{net}} / 2 \checkmark$

$$= (-2 \times 10^{-9} + 2 \times 10^{-9}) / 2 \checkmark$$

$$= -2 \times 10^{-9} \text{ C} \checkmark$$

$$n = \Delta Q / q_e$$

$$= (-2 \times 10^{-9} + 6 \times 10^{-9}) / 1,6 \times 10^{-19} \checkmark \checkmark$$

$$= 2,5 \times 10^{10} \text{ electrons / elektrone} \checkmark$$

(6)
[13]

QUESTION 11/VRAAG 11

11.1 The energy transferred per unit charge ✓✓
Die energie per eenheid-lading oorgedra (2)

11.2.1 $1/R_p = 1/R_1 + 1/R_2$ ✓

$$1/R_p = 1/6 + 1/12 \quad \checkmark$$

$$R_p = 4 \, \Omega \quad \checkmark$$

OR/OF $R_p = R_1 \cdot R_2 / (R_1 + R_2)$
 $= 6 \times 12 / (6 + 12)$
 $= 4 \, \Omega$

(3)

11.2.2 $I = 2/3 \times 0,9 = 0,6 \, \text{A}$ ✓

$$I = Q/\Delta t \quad \checkmark$$

$$0,6 \quad \checkmark = Q/40 \quad \checkmark$$

$$Q = 2,4 \, \text{C} \quad \checkmark$$

(5)

11.2.3 SAME AS / *DIESELFDE AS* ✓

(1)

11.2.4 DECREASES / *NEEM AF*

Total resistance decreases / *Totaal weerstand neem af*

(2)

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