



education
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

FURTHER EDUCATION AND TRAINING

NKANGALA DISTRICT

Stanmorephysics.com

GRADE 12

[PHYSICAL SCIENCES]

Stanmorephysics.com
MARCH 2025

CONTROLLED TEST

MARKS:100

TIME:2 HOURS

This question paper consists 10 of pages

INSTRUCTIONS AND INFORMATION

1. Write your examination number and centre number in the appropriate spaces on the ANSWER BOOK
2. This question paper consists of SEVEN questions. Answer ALL the questions in the ANSWER BOOK
3. Start EACH question on a NEW page in the ANSWER BOOK.
4. Number the answers correctly according to the numbering system used in this question paper
5. Leave ONE line between two sub questions, e.g. between QUESTION 2.1 and QUESTION 2.2.
6. You may use a non-programmable calculator.
7. You may use appropriate mathematical instruments
8. Show ALL formulae and substitutions in ALL calculations
9. Round off your FINAL numerical answers to a minimum of TWO decimal places.
10. Give brief motivations, discussions, etc. where required
11. You are advised to use the attached DATA SHEETS.
12. Write neatly and legibly.

QUESTION 1 MULTIPLE-CHOICE QUESTIONS

Various options are provided as possible answers to the following questions. Each question has only ONE correct answer. Choose the answer and write only the letter (A–D) next to the question numbers (1.1 to 1.10) in the ANSWER BOOK, e.g. 1.11 E.

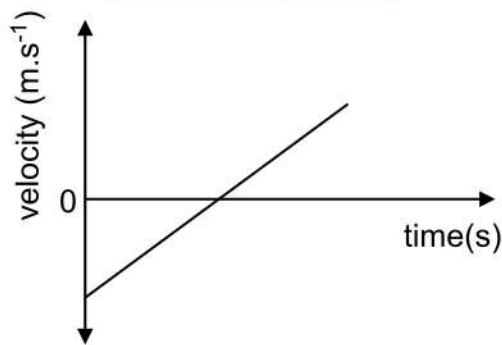
1.1 The tendency of an object to remain at rest or to continue in its uniform motion in a straight line is known as ...

- A Inertia
- B Newton's Second Law
- C Acceleration
- D Newton's third law

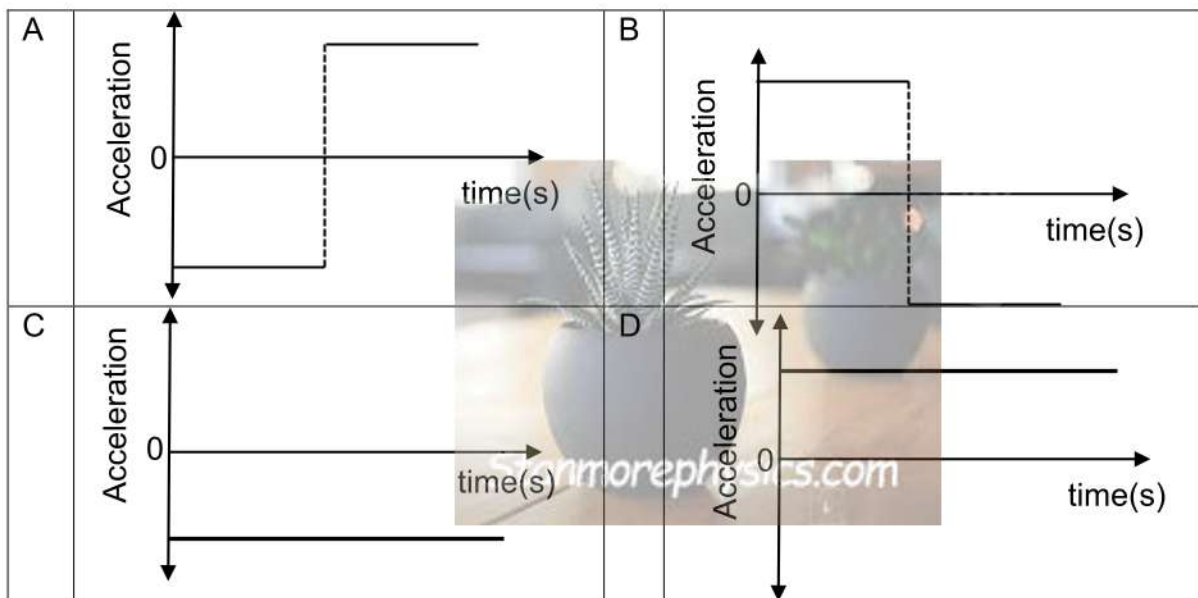


(2)

1.2 The velocity-time graph below represents the motion of an object.



Which ONE of the following graphs represents the corresponding acceleration-time graph for the motion of this object?



(2)

- 1.3 A ball of mass m strikes a wall perpendicularly at a speed v . Immediately after the collision the ball moves in the opposite direction at the same speed v . Which of the following is the correct change in momentum of the ball?

- A mv
 B 0
 C $3mv$
 D $2mv$

(2)

- 1.4 Which ONE of the following compounds CANNOT be an alkene?

- A C_2H_4
 B C_3H_8
 C C_3H_6
 D C_4H_8



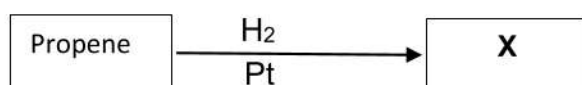
(2)

- 1.5 Which ONE of these compounds has the highest vapour pressure at room temperature?

- A Ethane
 B Ethanoic acid
 C Ethanol
 D Bromoethane

(2)

- 1.6 Consider the flow diagram below:



Compound **X** is:

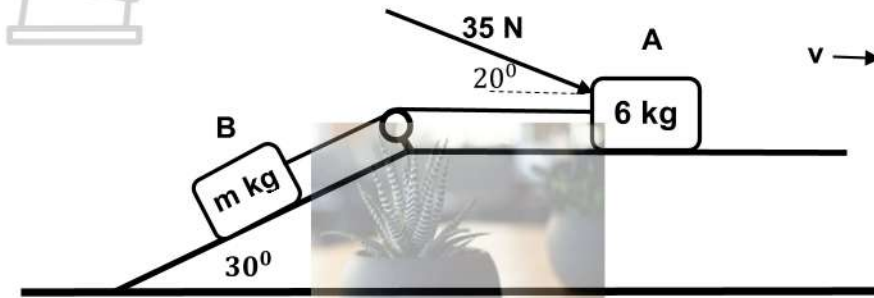
- A Propyne
 B Propan-1-ol
 C Propane
 D Propan-2-ol

(2)

[12]

QUESTION 2

Block A with a mass of 6 kg on a horizontal rough surface is connected to block B with an unknown mass along a rough inclined plane at an angle of 30° by means of an inextensible string passing over a frictionless pulley. A constant force of 35 N is applied on block A at an angle of 20° to the horizontal causing the two blocks to move with a CONSTANT VELOCITY as indicated below.



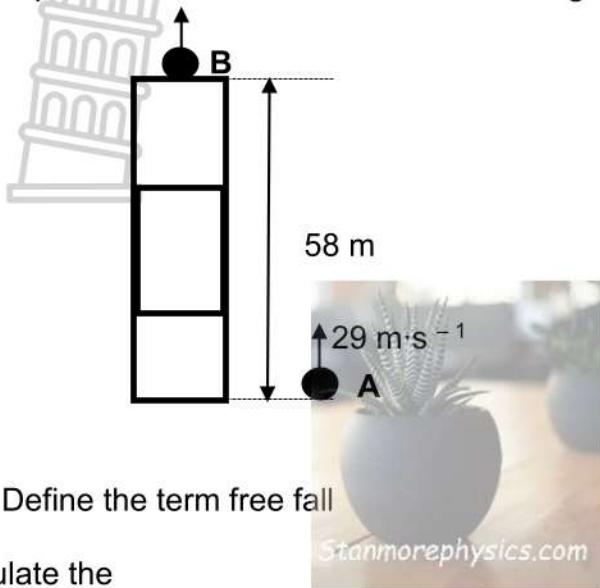
The coefficient of kinetic friction on block A is 0,2 and 0,15 for block B respectively.

- 2.1 State Newton's *second law* of motions in words. (2)
- 2.2 Draw a labelled free body diagram indicating ALL the forces acting on block the 6 kg block (5)
- 2.3 Calculate the magnitude of:
 - 2.3.1 Tension between the two blocks (4)
 - 2.3.2 Mass of block B (4)

[15]

QUESTION 3

Ball **A** is thrown vertically upwards from the **GROUND** of a tall building of height of 58 m with a speed of $29 \text{ m}\cdot\text{s}^{-1}$ as shown in the diagram. Ignore the effects of air friction.



3.1 Define the term free fall (2)

Calculate the

3.2 Maximum height reached by ball **A**. (3)

3.3 Total time that ball **A** is in the air. (4)

ONE SECOND after ball **A** was thrown vertically upwards, ball **B** is also thrown vertically upwards from the **TOP OF THE ROOF** of the building as shown in the diagram. Both balls reach the ground at the **SAME instant**. Ignore the effects of air friction.

3.4 Calculate the speed at which ball **B** is projected upwards from the roof. (4)

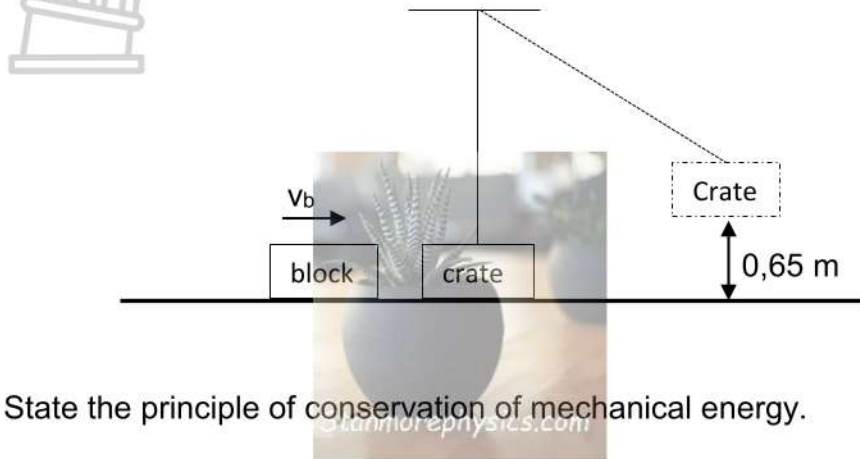
3.5 Sketch velocity-time graphs for the motion of both balls on the same set of axes. (4)
Clearly label the graphs for **A** and **B**. Indicate the following on the graphs:

- Initial velocities of ball **A** and **B**
- Time taken by both balls **A** and **B** to reach the ground.

[17]

QUESTION 4

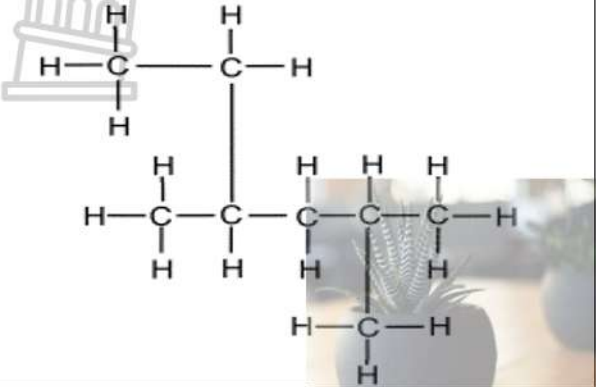
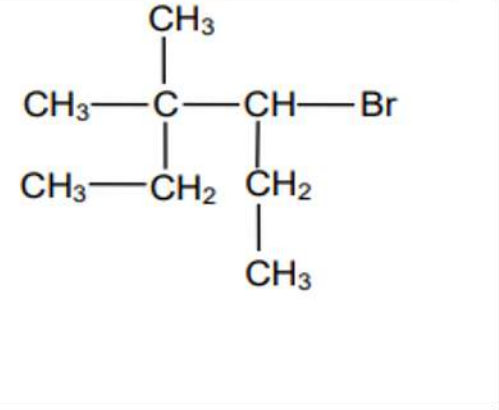
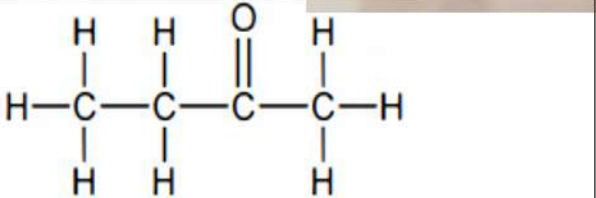
A 1,2 kg crate is attached to a long string as shown in the diagram below. A block of mass 0,4 kg collides with the stationary crate with a velocity v_b and rebounds with a velocity of $0,36 \text{ m}\cdot\text{s}^{-1}$ causing the crate to swing up through a vertical height of 0,65 m. Frictional forces are ignored.



- 4.1 State the principle of conservation of mechanical energy. (2)
- 4.2 Calculate the magnitude of the velocity of the crate immediately after the block collided with the crate. (4)
- 4.3 State the law of conservation of linear momentum. (2)
- 4.4 Calculate the velocity of the block, v_b , just before it collides with the crate. (4)
- [12]**

QUESTION 5

Consider the six organic compounds (**A - F**) given in the table below and answer the questions that follows

A		B	
C	$CH_3CH_2CHCHCH_3$	D	C_xH_yO
E		F	C_4H_8O

5.1 Define *functional group* (2)

5.2 Write down the following:

5.2.1 The letter/s that represent hydrocarbons (2)

5.2.2 Homologous series to which compound **E** belongs (1)

5.2.3 IUPAC name for compound **B** (3)

5.2.4 General formula to which compound **C** belongs (1)

5.2.5 IUPAC name for compound **C** (2)

5.3 Compound **E** and **F** are functional isomers

5.3.1 Explain what is meant by the underlined phrase above. (2)

5.3.2 Write down the name of the functional group of compound **E**. (1)

5.3.3 Write down the structural formula and IUPAC name for compound **F**. (3)

[17]

QUESTION 6

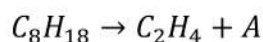
A group of learners conducted an experiment to evaluate the effect of CHAIN LENGTH on the boiling points of 3 straight chain alcohols (A - C). The results of the experiment are indicated on the table below.

Compound	Condensed structural formula	Boiling point (C°)
A	CH ₃ OH	64.7
B	CH ₃ CH ₂ OH	78.37
C	CH ₃ CH ₂ CH ₂ OH	97

- 6.1 Define boiling point. (2)
- 6.2 Write down the investigative question. (2)
- 6.3 Explain the trends on the boiling point of the three Organic compounds. (3)
- 6.4 Compound C is compared to Propanoic acid under the same conditions and their vapour pressures were recorded.
- 6.4.1 Which organic compound will have the highest vapour pressure between Compound C and Propanoic Acid? (1)
- 6.4.2 Fully explain the answer in QUESTION 6.4.1 by referring to the TYPE OF INTERMOLECULAR FORCES, STRENGTH and ENERGY. (4)

[12]**QUESTION 7**

- 7.1 Consider the cracking reaction below.



- 7.1.1 Define cracking. (2)
- 7.1.2 Write down the molecular formula of compound A. (1)
- Compound A undergoes a complete combustion.
- 7.1.3 Using **molecular formula** write the balanced equation for this reaction. (3)

7.2 Consider the equations for reactions I to III

A represent organic compound and **X** is an inorganic product.

I	$\text{CH}_3\text{CH}_2\text{CHCH}_2 + \text{HBr} \rightarrow \mathbf{A}$
II	$\mathbf{A} + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3 + \mathbf{X}$
III	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2(\text{OH}) + \text{CH}_3\text{COOH} \rightarrow \mathbf{P} + \text{H}_2\text{O}$

Write down the:

7.2.1 Type of reaction represented by reaction I. (1)

7.2.2 STRUCTURAL formula of compound A. (2)

7.2.3 Type of reaction represented by reaction II (1)

7.2.4 Formula of compound X (1)

For **reaction III**, write down the:

7.2.5 Type of reaction represented by reaction III (1)

7.2.6 The reaction condition other than heat. (1)

7.2.7 IUPAC name of compound P. (2)

[15]

TOTAL: 100

4.2 Information sheets – Paper 1 (Physics)

TABLE 1: PHYSICAL CONSTANTS

NAME	SYMBOL	VALUE
Acceleration due to gravity	g	9,8 m·s ⁻²
Universal gravitational constant	G	6,67 x 10 ⁻¹¹ N·m ² ·kg ⁻²
Radius of earth	R _E	6,38 x 10 ⁶ m
Mass of earth	M _E	5,98 x 10 ²⁴ kg
Speed of light in a vacuum	c	3,0 x 10 ⁸ m·s ⁻¹
Planck's constant	h	6,63 x 10 ⁻³⁴ J·s
Coulomb's constant	k	9,0 x 10 ⁹ N·m ² ·C ⁻²
Charge on electron	e	-1,6 x 10 ⁻¹⁹ C
Electron mass	m _e	9,11 x 10 ⁻³¹ kg

TABLE 2: FORMULAE

MOTION

$v_f = v_i + a \Delta t$	$\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$ OR $\Delta y = v_i \Delta t + \frac{1}{2} a \Delta t^2$
$v_f^2 = v_i^2 + 2a\Delta x$ OR $v_f^2 = v_i^2 + 2a\Delta y$	$\Delta x = \left(\frac{v_f + v_i}{2} \right) \Delta t$ OR $\Delta y = \left(\frac{v_f + v_i}{2} \right) \Delta t$

FORCE

$F_{\text{net}} = ma$	$p = mv$
$F_{\text{net}} \Delta t = \Delta p$ $\Delta p = mv_f - mv_i$	$w = mg$
$F = \frac{Gm_1 m_2}{r^2}$	$g = \frac{Gm}{r^2}$
$f_s^{\text{max}} = \mu_s N$	$f_k = \mu_k N$

WORK, ENERGY AND POWER

$W = F \Delta x \cos \theta$	$U = mgh$ or/of $E_p = mgh$
$K = \frac{1}{2} mv^2$ or/of $E_k = \frac{1}{2} mv^2$	$W_{\text{net}} = \Delta K$ or/of $W_{\text{net}} = \Delta E_k$
	$\Delta K = K_f - K_i$ or/of $\Delta E_k = E_{kf} - E_{ki}$
$W_{\text{nc}} = \Delta K + \Delta U$ OR $W_{\text{nc}} = \Delta E_k + \Delta E_p$	
$P = \frac{W}{\Delta t}$	$P = Fv$

4.3 Information sheets – Paper 2 (Chemistry)

TABLE 1: PHYSICAL CONSTANTS

NAME	SYMBOL	VALUE
Standard pressure	p^\ominus	$1,013 \times 10^5 \text{ Pa}$
Molar gas volume at STP	V_m	$22,4 \text{ dm}^3 \cdot \text{mol}^{-1}$
Standard temperature	T^\ominus	273 K
Charge on electron	e	$-1,6 \times 10^{-19} \text{ C}$
Avogadro's constant	N_A	$6,02 \times 10^{23} \text{ mol}^{-1}$

TABLE 2: FORMULAE

$n = \frac{m}{M}$	$n = \frac{N}{N_A}$
$c = \frac{n}{V}$ OR $c = \frac{m}{MV}$	$n = \frac{V}{V_m}$
$\frac{c_a V_a}{c_b V_b} = \frac{n_a}{n_b}$	$\text{pH} = -\log[\text{H}_3\text{O}^+]$
$K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 1 \times 10^{-14}$ at 298 K	
$E_{\text{cell}}^\ominus = E_{\text{cathode}}^\ominus - E_{\text{anode}}^\ominus$	
$E_{\text{cell}}^\ominus = E_{\text{reduction}}^\ominus - E_{\text{oxidation}}^\ominus$	
$E_{\text{cell}}^\ominus = E_{\text{oxidising agent}}^\ominus - E_{\text{reducing agent}}^\ominus$	



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FURTHER EDUCATION AND TRAINING

NKANGALA DISTRICT/ DISTRIK

GRADE/ GRAAD 12

[PHYSICAL SCIENCES/ FISIËSE WETENSKAPPE]

MARCH/ MAART 2025

CONTROLLED TEST/ KONTROLE TOETS

MARKING GUIDELINES/ NASIENRIGLYNE

MARKS/ PUNTE:100

TIME/ TYD :2 HOURS/ URE

This marking guideline paper consists 9 of pages
Hierdie nasienriglyn bestaan uit 9 bladsye

QUESTION/ VRAAG 1

- 1.1 A✓✓ (2)
 1.2 D✓✓ (2)
 1.3 D✓✓ (2)
 1.4 B✓✓ (2)
 1.5 A✓✓ (2)
 1.6 C✓✓ (2)

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[12]

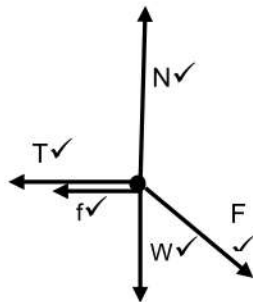
QUESTION/ VRAAG 2

2.1 When a net force acts on an object, the object will accelerate in the direction of the force and the acceleration is directly proportional to the force and inversely proportional to the mass of the object

Wanneer 'n resulterende/netto krag op 'n voorwerp inwerk, versnel die voorwerp in die rigting van die krag teen 'n versnelling direk eweredig aan die krag en omgekeerd eweredig aan die massa van die voorwerp. ✓✓

(2)

2.2



Accepted labels	
F	Fa/applied force/35N/ Toegepaste krag
N	Normal force/ F_N / Normaalkrag
T	Tension / F_T / Spanning
f	Frictional force / F_f/f_k / wrywingskrag
w	F_g / F_w /force of earth on block / weight / mg / gravitational force/ gewig/ gravitasiekrag

(5)

2.3.1 $F_{net}=ma$

$F_{net}=0$

$F\cos\theta - T - f = 0$

$F\cos\theta - T - \mu_k N = 0$

$F\cos\theta - T - (\mu_k mg + 35\sin 20^\circ) = 0$

$35 \cos 20 - T - (0.2)(6 \times 9.8 + 35\sin 20^\circ) = 0$ ✓

$T = 18.74 \text{ N}$ ✓

Any one ✓

Marking criteria
Formula/ Formule ✓
Substitution for friction / Vervanging van wrywing ✓
Whole substitution / Hele vervanging ✓
Answer with correct units / Antwoord met korrekte eenheid ✓

(4)

2.3.2 **POSITIVE MARKING FROM / POSITIEVE MERK VANAF 2.3.1**

$F_{net}=ma$

$F_{net}=0$

$T - (mg\sin\theta) - (\mu_k mg\cos\theta) = 0$

$18.74 - (m \times 9.8\sin 30^\circ) - (0.15)(m \times 9.8\cos 30^\circ) = 0$ ✓

$m = 3.03 \text{ kg}$ ✓

Any one / Enige een ✓

(4)

QUESTION/ VRAAG 3

- 3.1 Motion under the influence of the gravitational force/weight ONLY (2)
 Vryval is die beweging waartydens die ENIGSTE krag wat op 'n voorwerp inwerk, die gravitasiekrag is. ✓✓

3.2.

OPTION/ OPSIE 1	OPTION/ OPSIE 2
UPWARD AS POSITIVE/ OPWAARTS POSITIEF $v_f^2 = v_i^2 + 2a\Delta y$ ✓ $0^2 = 29^2 + 2(-9,8)\Delta y$ ✓ $\Delta y = 42,91\text{m}$ ✓ DOWNWARD AS POSITIVE/ AFWAARTS AS POSITIEF $v_f^2 = v_i^2 + 2a\Delta y$ ✓ $0^2 = (-29)^2 + 2(9,8)\Delta y$ ✓ $\Delta y = 42,91\text{m}$ ✓	DOWNWARD AS POSITIVE/ AFWAARTS AS POSITIEF $v_f^2 = v_i^2 + 2a\Delta y$ ✓ $29^2 = 0^2 + 2(9,8)\Delta y$ ✓ $\Delta y = 42,91\text{m}$ ✓ UPWARD AS POSITIVE/ OPWAARTS POSITIEF $v_f^2 = v_i^2 + 2a\Delta y$ ✓ $(-29)^2 = 0^2 + 2(-9,8)\Delta y$ ✓ $\Delta y = 42,91\text{m}$ ✓

(3)

3.3

OPTION/ OPSIE 1	OPTION/ OPSIE 2
UPWARD AS POSITIVE/ OPWAARTS POSITIEF $v_f = v_i + a\Delta t$ ✓ $-29 \checkmark = 29 + (-9,8)\Delta t$ ✓ $\Delta t = 5,92 \text{ s}$ ✓ DOWNWARD AS POSITIVE/ AFWAARTS AS POSITIEF $v_f = v_i + a\Delta t$ ✓ $29 \checkmark = -29 + (9,8)\Delta t$ ✓ $\Delta t = 5,92 \text{ s}$ ✓	UPWARD AS POSITIVE/ OPWAARTS POSITIEF $v_f = v_i + a\Delta t$ ✓ $0 = 29 + (-9,8)\Delta t$ ✓ $\Delta t = 2,96 \text{ s}$ $\Delta t = 2 \times 2,96 \checkmark = 5,92 \text{ s}$ ✓ DOWNWARD AS POSITIVE/ AFWAARTS AS POSITIEF $v_f = v_i + a\Delta t$ ✓ $29 \checkmark = -29 + (-9,8)\Delta t$ ✓ $\Delta t = 5,92 \text{ s}$ ✓

(4)

3.4 **POSITIVE MARKING FROM/ POSITIEWE MERK VANAF 3.3**

UPWARD AS POSITIVE/ OPWAARTS POSITIEF $\Delta y = v_i\Delta t + \frac{1}{2} a\Delta t^2$ ✓ $-58 \checkmark = v_i(5,92-1) + \frac{1}{2}(-9,8)(5,92-1)^2$ ✓ $v_i = 12,32 \text{ m}\cdot\text{s}^{-1}$ ✓	DOWNWARD AS POSITIVE/ AFWAARTS AS POSITIEF $\Delta y = v_i\Delta t + \frac{1}{2} a\Delta t^2$ ✓ $58 \checkmark = v_i(5,92-1) + \frac{1}{2}(9,8)(5,92-1)^2$ ✓ $v_i = 12,32 \text{ m}\cdot\text{s}^{-1}$ ✓
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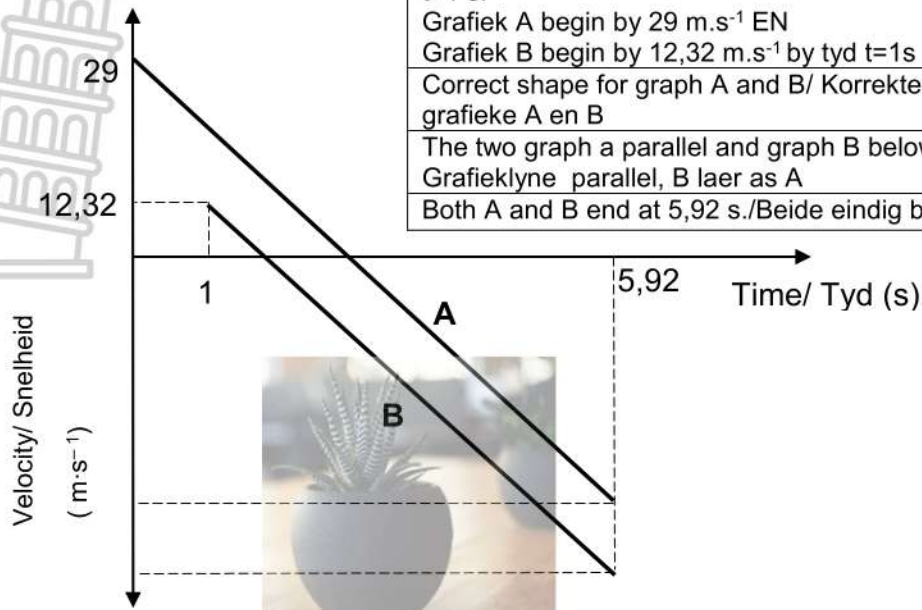
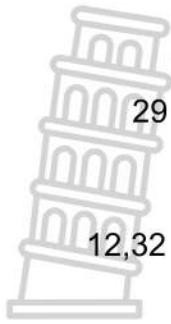
(4)

3.5 POSITIVE MARKING FROM/ POSITIEWE MERK VANAF 3.3 and/ en 3.4

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UPWARD AS POSITIVE/

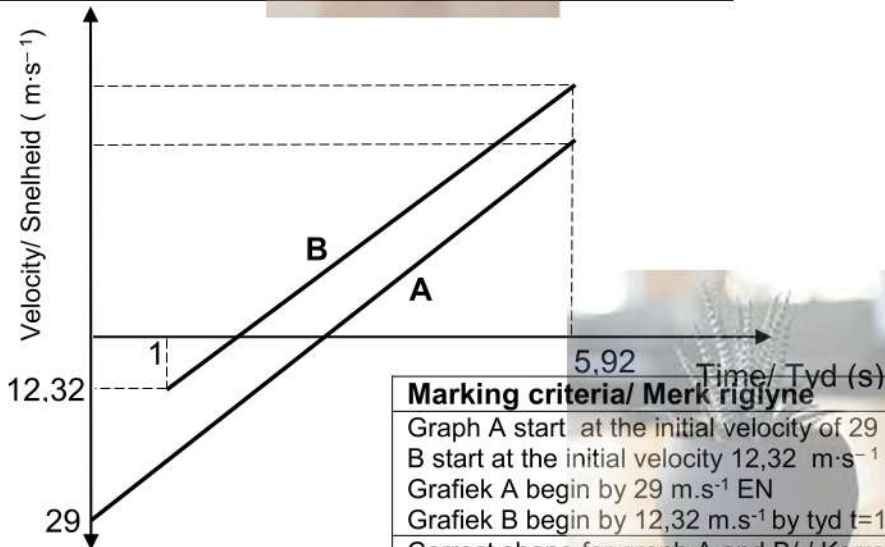
OPWAARTS AS POSITIEF



Marking criteria/ Merk riglyne

Graph A start at the initial velocity of $29 \text{ m}\cdot\text{s}^{-1}$ and Graph B start at the initial velocity $12,32 \text{ m}\cdot\text{s}^{-1}$ and at $t=1 \text{ s}$. Grafiek A begin by $29 \text{ m}\cdot\text{s}^{-1}$ EN Grafiek B begin by $12,32 \text{ m}\cdot\text{s}^{-1}$ by tyd $t=1 \text{ s}$	✓
Correct shape for graph A and B/ Korrekte vorm vir grafieke A en B	✓
The two graph a parallel and graph B below A. Grafieklyne parallel, B laer as A	✓
Both A and B end at $5,92 \text{ s}$./Beide eindig by $5,92 \text{ s}$	✓

DOWNWARD AS POSITIVE/ AFWAARTS AS POSITIEF



Marking criteria/ Merk riglyne

Graph A start at the initial velocity of $29 \text{ m}\cdot\text{s}^{-1}$ and Graph B start at the initial velocity $12,32 \text{ m}\cdot\text{s}^{-1}$ and at $t=1 \text{ s}$. Grafiek A begin by $29 \text{ m}\cdot\text{s}^{-1}$ EN Grafiek B begin by $12,32 \text{ m}\cdot\text{s}^{-1}$ by tyd $t=1 \text{ s}$	✓
Correct shape for graph A and B/ / Korrekte vorm vir grafieke A en B	✓
The two graph a parallel and graph B above A./ Grafieklyne parallel, B laer as A	✓
Both A and B end at $5,92 \text{ s}$./ Beide eindig by $5,92 \text{ s}$	✓

(4)

QUESTION/ VRAAG 4

(2)

- 4.1 [Downloaded from Stanmorephysics.com](http://Stanmorephysics.com)
 In an isolated system the total mechanical energy is conserved/remains constant.
 Die totale meganiese energie (som van gravitasie- potensiele energie en kinetiese energie) in 'n geslote sisteem bly konstant. ✓✓

$$4.2 \quad \sum (mg + \frac{1}{2}mv^2)_i = \sum (mg + \frac{1}{2}mv^2)_f$$

$$0 + \frac{1}{2} \times 1,2 \times v_i^2 = 1,2 \times 0,65 + 0$$

$$v_i = 3,57 \text{ m} \cdot \text{s}^{-1}$$

(4)

- 4.3 In an isolated system the total linear momentum is conserved/remains constant.
 Die totale lineêre momentum in 'n geïsoleerde sisteem bly konstant (behoue). ✓✓

(2)

4.4 POSITIVE MARKING FROM/ POSITIEWEE MERK VANAF 4.2

$$\sum p_i = \sum p_f$$

$$m_1v_{i1} + m_2v_{i2} = m_1v_{f1} + m_2v_{f2}$$

$$0,4 \times v_b + 0 = 0,4 \times (-0,36) + 1,2 \times 3,57$$

$$v_b = 10,35 \text{ m} \cdot \text{s}^{-1}$$

Any one/ Enige een ✓

(4)

[12]**QUESTION/ VRAAG 5**

- 5.1 A bond or an atom or a group of atoms that determine(s) the (physical and chemical) properties of a group of organic compounds
 Funkionele groep: 'n Binding of 'n atoom of 'n groep atome wat die fisiese en chemiese eienskappe van 'n groep organiese verbindings bepaal ✓✓

(2)

5.2.1 A ✓ & C ✓

(2)

5.2.2 Ketone / Keton ✓

5.2.3 4-bromo-3,3-dimethylhexane
 4-bromo-3,3-dimietielheksaan

Marking criteria

- Correct stem i.e hexane/ Korrekte stamnaam ✓
- All substituents (bromo and dimethyl) correctly identified./ Alle substituenten (bromo en dimetiel) korrek geïdentifiseer ✓
- Correct IUPAC name / Korrekte IUPAC naam. ✓

(1)

(3)

5.2.4 C_nH_{2n} ✓

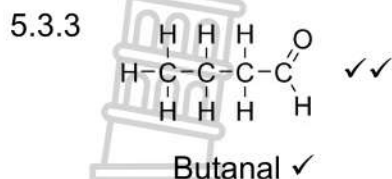
(1)

5.2.5 Pent-2-ene/ Pent-2-een ✓✓

(2)

5.3.1 Compound with the same molecular formula but different functional groups
 Organiese molekule met dieselfde molekulêre formule, maar verskillende funksionele groepe ✓✓ (2)

5.3.2 Carbonyl/ Karboniel ✓ (1)



Marking criteria / Nasienriglyn

- Correct functional group/ Korrekte funksionele groep ✓
- Whole structure. Hele struktuur ✓
- Correct IUPAC name/ Korrekte IUPAC ✓

(3)

[17]

QUESTION/ VRAAG 6

6.1 Temperature at which the vapour pressure equals atmospheric pressure./✓✓
 Die temperatuur waarby die dampdruk van die stof gelyk is aan atmosferiese druk. (2)

6.2 What is the relationship between chain length/ surface area/ molecular mass and boiling point of organic compound ?

Wat is die verband tussen kettinglengte/ oppervlakte/ molekulêre massa en kookpunt van organiese verbinding? ✓✓

Marking criteria/ Merk riglyne

- Must be a question/ Moet 'n vraag wees (?)
- Dependent variable / Afhanklike veranderlike
- Independent variable / Onafhanklike veranderlike

(2)

6.3 • Chain length / surface area/ molecular mass increases from A-C.
 Kettinglengte /oppervlakte/ molekulêre massa neem toe vanaf A-C ✓
 • The strength of London forces/ intermolecular forces increases from A-C.
 Die sterkte van Londen-kragte/ intermolekulêre kragte neem toe vanaf A-C ✓
 • More energy needed to overcome intermolecular forces.
 Meer energie word benodig om intermolekulêre kragte te oorkom ✓ (3)

6.5.2 Compound/ Verbinding C ✓ (1)

6.5.3 • Between molecules of C/ alcohol has hydrogen bonds with one site of bonding
 Tussen molekules van C/ alkohol is daar waterstofbindings met een plek van binding ✓
 • Between molecules of propanoic acid/ carboxylic acids has hydrogen bonds with two sites of bonding ✓ (4)

- Intermolecular forces in propanoic acid/carboxylic acids are stronger than in compound C /alcohol

Die Intermolekulêre kragte in propaansuur/karboksielsure is sterker as in verbinding C/ alkohol ✓

- More energy is needed to overcome intermolecular forces in carboxylic acids/propanoic acid than alcohol/ compound C.

Meer energie is nodig om intermolekulêre kragte in karboksielsure/ propaansuur te oorkom as alkohol/ verbinding C ✓

[12]

QUESTION/ VRAAG 7

7.1.1 The chemical process/reaction in which longer chain hydrocarbon/alkane molecules are broken down to shorter (more useful) molecules.

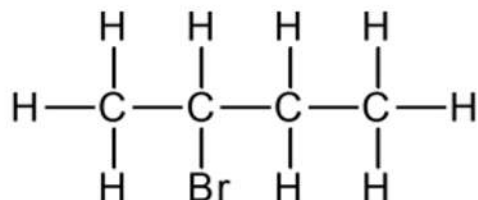
Die chemiese proses waarin langer kettingkoolwaterstof-molekule afgebreek word in korter, meer bruikbare, molekules ✓✓

7.1.2 C_6H_{14} ✓

7.1.3 $2C_6H_{14} + 19O_2 \rightarrow 14H_2O + 12CO_2$ ✓ Balancing / Balansering ✓

7.2.1 Addition/Addisie (Hydrohalogenation/ Hidrohalogenasie) ✓

7.2.2



Marking criteria/ Merk riglyne

- Correct functional group/ Korrekte funksionele groep ✓
- Whole structure./ Hele struktuur ✓

7.2.3 Substitution/ Substitusie (Hydrolysis) ✓

7.2.4 HBr ✓

7.2.5 Esterification/ Esterifikasie ✓

7.2.6 Concentrated Sulphuric acid / Gekonsentreerde Swaelsuur ✓

7.2.7 Butyl ethanoate / Butieletanoaat ✓✓

[15]

TOTAL/ TOTAAL: 100