education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 12

PHYSICAL SCIENCES

MARCH 2025

CONTROL TEST

MARKS: 100

TIME: 2 hours

This paper consists of 16 pages including DATASHEET and the PERIODIC TABLE

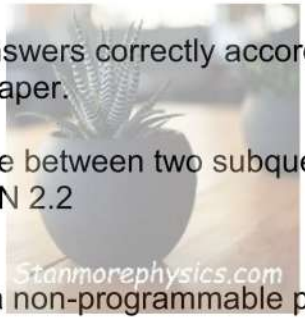
INSTRUCTIONS AND INFORMATION

1. Write your name and other information in the appropriate spaces on the ANSWER BOOK.

2. This question paper consists of SEVEN questions. Answer ALL questions in the ANSWER BOOK.

3. Number the answers correctly according to the numbering system used in this question paper.

4. Leave ONE line between two subquestions, e.g. between QUESTION 2.1 and QUESTION 2.2



5. You may use a non-programmable pocket calculator.

6. Show ALL formulae and substitutions in ALL calculations.

7. Round off your FINAL numerical answers to a minimum of TWO decimal places where applicable.

8. Give brief motivationa, discussions,etc. where required.

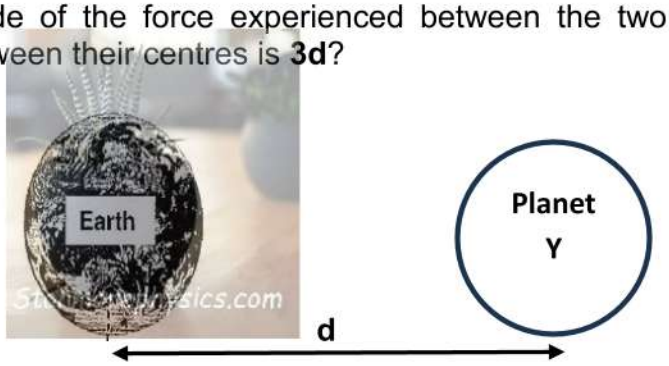
9. You are advised to use the attached DATA SHEETS.

10. Write neatly and legibly.

QUESTION 1

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 1.16) in the ANSWER BOOK, e.g. **1. 11 D.**

1.1 The gravitational force that the earth and Planet Y exerts on each other is **F** when there is a distance **d** between their centres. What would be the magnitude of the force experienced between the two when the distance between their centres is **3d**?



A 9F.

B $\frac{1}{3}$ F.

C $\frac{1}{9}$ F.

D 3 F. (2)

1.2 The change in momentum of an object can be equated to its…

A change in velocity.

B product of mass and velocity.

C change in kinetic energy.

D product of net force and change in time. (2)

1.3 A hot air balloon is descending at a velocity of 7,5 $m \cdot s^{-1}$ when a boy throws a plastic disc upwards at a velocity of 4 $m \cdot s^{-1}$. What is the initial velocity of plastic disc?

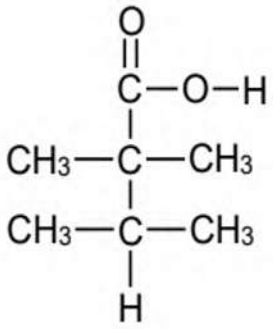
A 11,5 $m \cdot s^{-1}$ downwards.

B 3,5 $m \cdot s^{-1}$ downwards.

C 4 $m \cdot s^{-1}$ downwards.

D 7,5 $m \cdot s^{-1}$ downwards. (2)

1.4 The condensed structural formula of a compound is shown below.



Which one of the following is the correct IUPAC name for this compound?

A 2,2,1,1-tetramethylpropanoic acid

B 2,2,3- trimethylbutanoic acid

C 1,1,2,2-tetramethylpropanoic acid

D 3,2,2-trimethylbutanoic acid (2)

1.5 Which one of the following *functional groups* has the strongest intermolecular forces.

A Hydroxyl and Formyl

B Formyl and Carbonyl

C Hydroxyl and Carboxyl

D Carboxyl and Carbonyl (2)

1.6 The following cracking reaction takes place in high temperatures and pressures.

Pentane ⟶ X + Y

Which of the following compounds are likely to be the products of the above reaction?

A Ethene + propane

B Ethane + propane

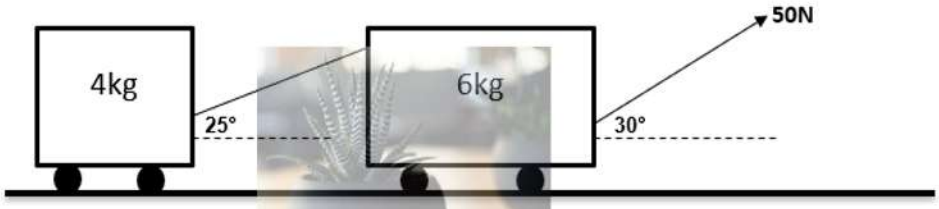
C Propene + ethene

D Ethanol + propanol (2)

[12]

QUESTION 2

Two toy cars of mass 4kg and 6kg respectively are connected by a light inextensible rope inclined at 25° to the horizontal as shown. The 6kg toy car is pulled by a 50N applied force inclined at 30° to the horizontal. The kinetic frictional force experienced by the 4kg and 6 kg toy cars are 10 N and 15 N respectively.



2.1 State *Newton's second law of motion* in words. (2)

2.2 Draw a labelled free-body diagram showing all forces acting on the 6kg toy car. (5)

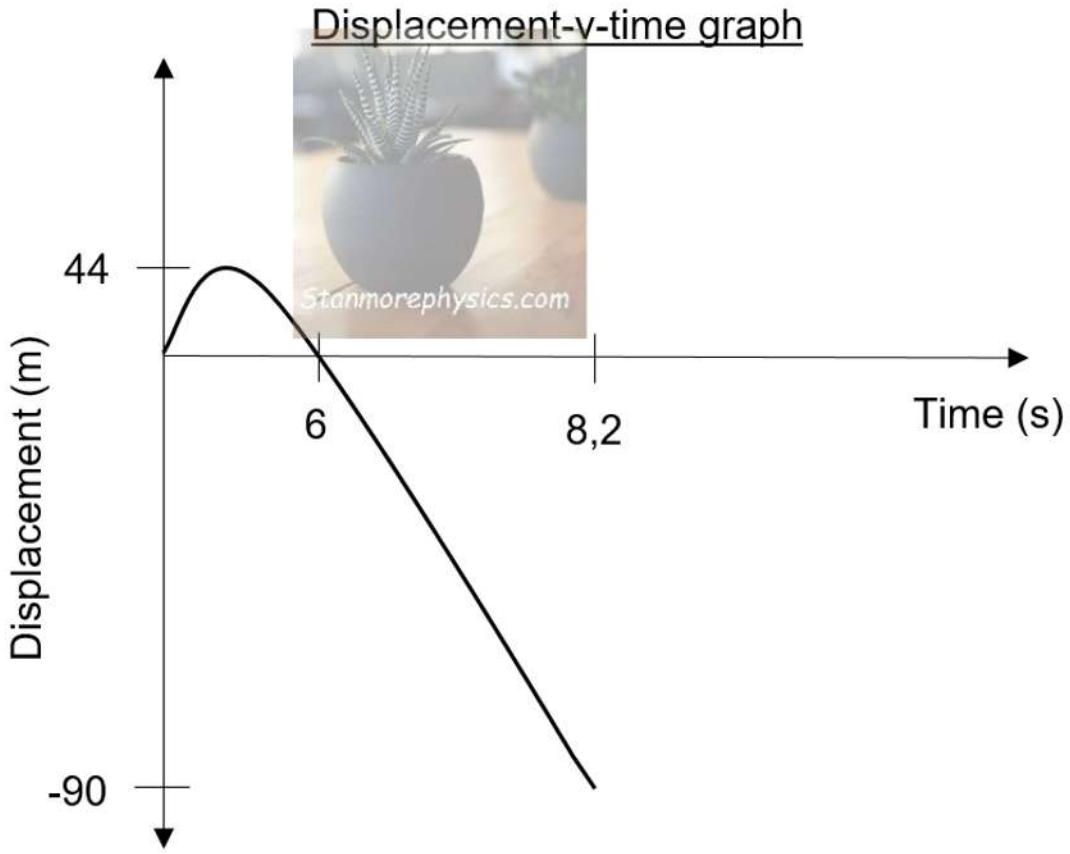
2.3 Calculate the acceleration experienced by the toy cars. (6)

2.4 Calculate the tension on the rope. (2)
[15]

QUESTION 3

A girl was standing on top of a hotel building playing with a ball of mass 1,2 kg. She projected the ball upwards and failed to catch it on its way down. The ball fell to the ground.

The position versus time graph below shows the motion of the ball from the moment it was projected until it reached the ground.



3.1 Define the term Free *fall*. (2)

3.2

3.2.1 What is the height of the building from which the ball was thrown? (1)

3.2.2 What is the acceleration of the ball at maximum height? (1)

3.3 Using equations of motion only, Calculate the:

3.3.1 Initial velocity of the ball. (3)

3.3.2 Velocity with which the ball hits the ground. (3)

3.3.3 While the ball is in contact with the ground, it experiences a Net force of 130 N and then bounces off the ground with a velocity of 16,5 $m.s^{-1}$.
Calculate the time the ball was in contact with the ground. (4)

3.4 Draw a velocity versus time graph for the motion of the ball from the moment it was thrown until it strikes the ground.
On the graph show the following:

- Velocity at which the ball was thrown and
- Velocity at which the ball hits the ground. (3)

[17]

QUESTION 4

A group of learners were investigating the *rate of change in momentum* using two trolleys, Trolley **A** with mass 2 kg and Trolley **B** with a mass of 5 kg were placed on a flat frictionless surface. Trolley **A** moves easterly towards a stationery trolley **B**, the two trolleys collide and move together after the collision.
The table below shows the initial velocities of trolley **A** and the collision time for two collision trails that took place between the trolleys.

Trolley A	Initial velocity ($m \cdot s^{-1}$)	Contact time(s)
Trail 1	1,5	0.4
Trail 2	2	0.25

4.1 State the term represented by the words in italics in the above statement. (1)

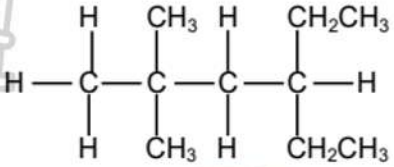
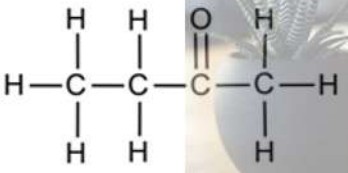
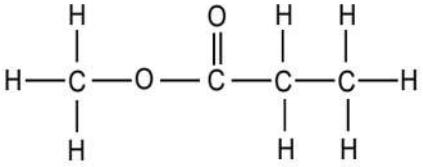
4.2 Calculate the magnitude of the velocity of the two trolleys after collision in **trail 1**. (4)

4.3 Calculate the net force experienced by trolley **B** in **trial 2**. (5)

4.4 Will the magnitude of the forces that the trolleys exert on each other in trial 1 be EQUAL to the magnitude of the forces in Trail 2? Choose from YES or NO. Give a reason for the answer. (2)
[12]

QUESTION 5

Consider organic compounds represented by letters **A** to **F** in the table below.

A		**B**	Butanoic acid
C		**D**	$CH_3CH(CH_3)CH_2CHClCH_3$
E	$CH_3CH_2CH_2COH$	**F**	

Use the information in the table to answer the questions that follow.

5.1 Write down a letter that represents the following.

5.1.1 A Haloalkane. (1)

5.1.2 A compound that has a Carboxyl group as a functional group. (1)

5.2 Write down the :

5.2.1 IUPAC name of compound **A**. (3)

5.2.2 General formula of compound **A.** (1)

5.2.3 IUPAC name of compound **E**. (2)

5.2.4 Structural formula of compound **D** . (3)

5.3 Compound **C** and **E** are isomers.

5.3.1 Define the term *structural isomer*. (2)

5.3.2 Identify the type of Isomerism between the two compounds? (1)

5.4 Compound **F** is an ester. Write down the…

5.4.1 IUPAC name of this ester. (2)

5.4.2 structural formula of the alcohol that was used to produce this ester. (2)

5.4.3 inorganic compound that is produced in the process of producing the ester. (1)

[19]

QUESTION 6

Learners use the following compounds to investigate the factors that affect the vapour pressure of organic compounds.

	COMPOUND	VAPOUR PRESSURE (kPa at 25°C)
A	2-methly propane	150
B	Butane	83
C	Propan-1-ol	54
D	Ethanoic acid	26

6.1 Define the term *Vapour pressure*. (2)

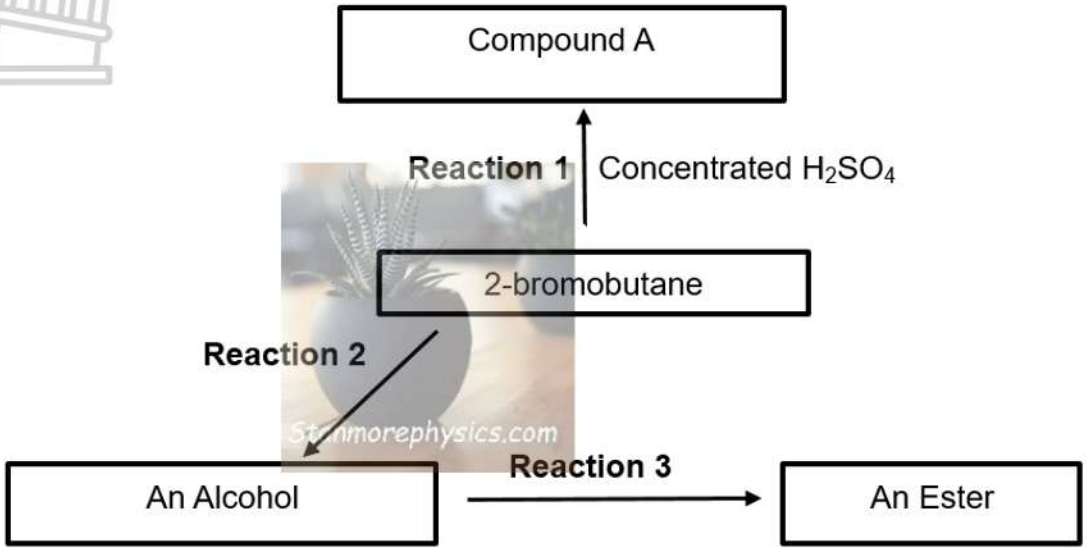
6.2 Which compound **A** or **B** has a higher boiling point?

Explain your answer. (4)

6.3 Explain the difference in vapour pressures of compound **C** and **D** by referring to the TYPE OF INTERMOLECULAR FORCES present in each compound. (4)
[10]

QUESTION 7

In the flow diagram below 2-bromobutane undergoes different reactions as illustrated. Answer the questions that follow.



7.1 Consider **reaction 1**, write down the:

7.1.1 Type of reaction that takes place. (1)

7.1.2 IUPAC name of compound A which is a major product. (2)

7.2 Consider **reaction 2**, write down the:

7.2.1 Type of reaction that takes place. (1)

7.2.2 Structural formula of the alcohol. (2)

7.2.3 Reaction conditions (2)

7.3 Consider **reaction 3**

7.3.1 Write down the homologous series to which the OTHER organic reactant in this reaction belongs. (1)

7.3.2 The ester contains 6,6% of Hydrogen(H), 40% of Carbon(C) and 53,33% of Oxygen (O). The molar mass of the ester is 150g·mol^{-1}. Use a calculation to determine its molecular formula. (6)

[15]

TOTAL: 100

DATA FOR PHYSICAL SCIENCES GRADE 12
PAPER 1 (PHYSICS)

TABLE 1: PHYSICAL CONSTANTS

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

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

FORCE

$F_{net} = ma$	$p = mv$
$f_s^{max} = \mu_s N$	$f_k = \mu_k N$
$F_{net}\Delta t = \Delta p$ $\Delta p = mv_f - mv_i$	$w = mg$
$F = \frac{Gm_1m_2}{d^2}$ OR $F = \frac{Gm_1m_2}{r^2}$	$g = \frac{GM}{d^2}$ OR $g = \frac{GM}{r^2}$

CHEMISTRY

$n = \frac{m}{M}$			$n = \frac{N}{N_A}$
$c = \frac{n}{V}$	or/*of*	$c = \frac{m}{MV}$	$n = \frac{V}{V_m}$

TABLE 3: PERIODIC TABLE

KEY: Atomic number → 29 | Electronegativity → 1,9 | Cu ← Symbol | 63,5 ← Approximate relative atomic mass

1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
2,1 **H** 1																	2 **He** 4
1,0 **Li** 7	1,5 **Be** 9											2,0 **B** 11	2,5 **C** 12	3,0 **N** 14	3,5 **O** 16	4,0 **F** 19	**Ne** 20
0,9 **Na** 23	1,2 **Mg** 24											1,5 **Aℓ** 27	1,8 **Si** 28	2,1 **P** 31	2,5 **S** 32	3,0 **Cℓ** 35,5	**Ar** 40
0,8 **K** 39	1,0 **Ca** 40	1,3 **Sc** 45	1,5 **Ti** 48	1,6 **V** 51	1,6 **Cr** 52	1,5 **Mn** 55	1,8 **Fe** 56	1,8 **Co** 59	1,8 **Ni** 59	1,9 **Cu** 63,5	1,6 **Zn** 65	1,6 **Ga** 70	1,8 **Ge** 73	2,0 **As** 75	2,4 **Se** 79	2,8 **Br** 80	**Kr** 84
0,8 **Rb** 86	1,0 **Sr** 88	1,2 **Y** 89	1,4 **Zr** 91	**Nb** 92	1,8 **Mo** 96	1,9 **Tc**	2,2 **Ru** 101	2,2 **Rh** 103	2,2 **Pd** 106	1,9 **Ag** 108	1,7 **Cd** 112	1,7 **In** 115	1,8 **Sn** 119	1,9 **Sb** 122	2,1 **Te** 128	2,5 **I** 127	**Xe** 131
0,7 **Cs** 133	0,9 **Ba** 137	**La** 139	1,6 **Hf** 179	**Ta** 181	**W** 184	**Re** 186	**Os** 190	**Ir** 192	**Pt** 195	**Au** 197	**Hg** 201	1,8 **Tℓ** 204	1,8 **Pb** 207	1,9 **Bi** 209	2,0 **Po**	2,5 **At**	**Rn**
0,7 **Fr**	0,9 **Ra** 226	**Ac**															

58 **Ce** 140	59 **Pr** 141	60 **Nd** 144	61 **Pm**	62 **Sm** 150	63 **Eu** 152	64 **Gd** 157	65 **Tb** 159	66 **Dy** 163	67 **Ho** 165	68 **Er** 167	69 **Tm** 169	70 **Yb** 173	71 **Lu** 175
90 **Th** 232	91 **Pa**	92 **U** 238	93 **Np**	94 **Pu**	95 **Am**	96 **Cm**	97 **Bk**	98 **Cf**	99 **Es**	100 **Fm**	101 **Md**	102 **No**	103 **Lr**

education

Lefapha la Thuto la Bokone Bophirima
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North West Department of Education
NORTH WEST PROVINCE

PROVINCIAL ASSESSMENT

PROVINSIALE ASSESSERING

GRADE/*GRAAD* 12

PHYSICAL SCIENCES/*FISIESE WETENSKAP*

MARCH/*MAART* 2025

CONTROL TEST/*KONTROLE TOETS*

MARKING GUIDELINE/*NASIENRIGLYNE*

MARKS/*PUNTE*: **100**

TIME/*TYD*: **2 hours/*uur***

QUESTION 1/*VRAAG 1*

1.1 C ✓✓ (2)

1.2 D ✓✓ (2)

1.3 B ✓✓ (2)

1.4 B ✓✓ (2)

1.5 C ✓✓ (2)

1.6 A ✓✓ (2)

[12]

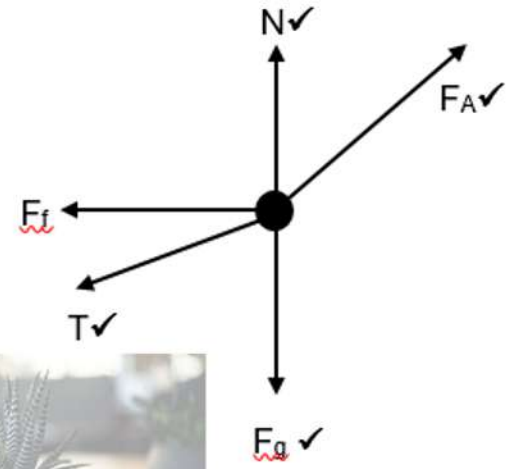
QUESTION 2/ *VRAAG 2*

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

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

Marking criteria/*Nasienkriteria*
If any of the underlined key words or phrases in the correct context is omitted, deduct 1 mark./*Indien enige van die onderstreepte sleutelwoorde of frases in die korrekte konteks uitgelaat word, trek 1 punt af.* (2)

2.2



Accepted labels/*Aanvaarde benoemings* :	
Tension force /T/F_T/*Spankrag*	✓
Weight/W/Gravitational force/Fg/*Gewig*/*Gravitasiekrag*	✓
Normal force/F_N/Normal/N/*Normaalkrag*/*Normaal*	✓
Force applied/Fa/*Toegepaste krag*/F_T	✓
Frictional force/f/F_f/F_k/*Wrywingskrag*	✓

NOTE/*NOTA*:

- Mark is awarded for **label** and **arrow**. If no arrows 4/5 /*Punte word toegeken vir die* ***benoeming*** *en die* ***pyle****. Indien geen pylpunt 4/5.*
- Do not penalise for length of arrows./*Moet nie penaliseer vir die lengte van die pyle nie.*
- If incorrect angles (directions) of the applied force and/or Tension force - 4/5 / *Indien die verkeerde hoeke (rigtings) van die toegepaste krag en/of die spankrag – 4/5.*
- Any other additional forces - 4/5 /*Enige addisionele kragte – 4/5.*
- If components of applied force or tension force are drawn – 4/5 /*As komponente van toegepaste krag of spankrag geteken word – 4/5.*
- If any arrow does not touch the dot - 4/5 /*Indien enige pyl nie die kol raak nie – 4/5.*

(5)

2.3

OPTION 1/*OPSIE 1*

4kg toy car / *4kg speelgoedkar*

Fnet =ma ✓

$-f + T_x = ma$

$-10 + T_x$ ✓$= 4a$

$T_x = 4a + 10$.....(1)

✓ **(any 1/*enige 1*)**

6kg toy car / *6kg speelgoedkar*

$-T_x - f + F_{ax} = ma$

$-T_x - 15 + 50\cos 30°$ ✓$= 6a$.....(2)

Sub (1) into (2) / *Vervang (1) in (2)*

$-(4a + 10) - 15 + 50\cos 30° = 6a$

$-(4a + 10) + 28{,}30127 = 6a$✓

$-10 + 28{,}30127 = 10a$

$a =$ 1,83 m.s^{-2} to the right ✓ *Ina regs*

OPTION 2/ *OPSIE 1*

4kg toy car/ *4kg speelgoedkar*

Fnet =ma ✓

$-f + T_x = ma$

$-10 + T\cos 25°$ ✓$= 4a$

$a = \frac{T\ COS\ 25}{4} - \frac{10}{4}$.....(1)

✓ **(any 1/*enige 1*)**

6kg toy/ *5kg speelgoedkar*

$-T_x - f + F_{ax} = ma$

$-T\ COS\ 25° - 15 + 50\cos 30°$ ✓$= 6a$.....(2)

Sub (1) into (2) / *Vervang (1) in (2)*

$-T\ COS\ 25° - 15 + 50\cos 30° = 6\left(\frac{T\ COS\ 25}{4} - \frac{10}{4}\right)$

$T = 19.11$ N

Sub T into (1) or (2) / *Vervang T in (1) of (2)*

$a = \frac{19.11\ COS\ 25}{4} - \frac{10}{4}$ ✓

$a =$ 1,83 m.s^{-2} to the right ✓

(6)

2.4 **Positive marking from 2.3/*Positiewe nasien van 2.3***

$T_x = 4(1{,}83) + 10$

$= 17{,}3204$ N

$T_x = T\cos 25°$

$T = 17{,}3204 \div \cos 25°$✓

$= 19{,}11$ N✓

Note: two marks for answer if calculated in 2.3 above./ ***Nota:***
twee punte vir die antwoord indien dit bereken is in 2.3 hierbo. (2)

[15]

QUESTION 3/ *VRAAG 3*

3.1 A motion of an object during which the only force acting on it is the gravitational force. ✓✓
Die beweging van 'n voorwerp waarop die enigste krag wat daarop inwerk, die gravitasiekrag is. **(2 or/*of* 0)** (2)

3.2

3.2.1 90 m✓ (1)

3.2.2 9,8 $m \cdot s^{-2}$ downwards✓/*afwaarts* (1)

3.3 **TAKING UPWARD AS POSITIVE/*NEEM OPWAARTS AS POSITIEF***

3.3.1

Option 1/*Opsie 1*	**Option 2/*Opsie 2***
$V_f = V_i + a\Delta t$ ✓ $0 = V_i + (-9,8)$ (3) ✓ $V_i = 29,4\ m.s^{-1}$ upwards✓/*opwaarts*	$V_f = V_i + a\Delta t$ ✓ $-V_i = V_i + (-9,8)(6)$ ✓ $V_i = 29,4\ m.s^{-1}$ upwards✓/*opwaarts*
Option 3/*Opsie 3*	**Option 4/*Opsie 4***
$\Delta y = V_i \Delta t + \frac{1}{2} a\Delta t^2$ ✓ $-90 = V_i \times 8,2 + \frac{1}{2}(-9.8)(8.2)^2$ ✓ $V_i = 29,4\ m.s^{-1}$ upwards✓/*opwaarts*	$V_f^2 = V_i^2 + 2a\Delta y$ $= 0 + 2(-9.8)(-134)$ $V_f = 51.23\ m.s^{-1}$ $V_f^2 = V_i^2 + 2a\Delta y$ ✓ $51.23^2 = V_i^2 + 2(-9.8)(-90)$ ✓ $V_i = 29,34\ m.s^{-1}$ upwards ✓/*opwaarts*

Range/*Gebied* *(29,33-29,41)*
Note: Accept downwards as positive.
***Nota**: Neem afwaarts as positief.* (3)

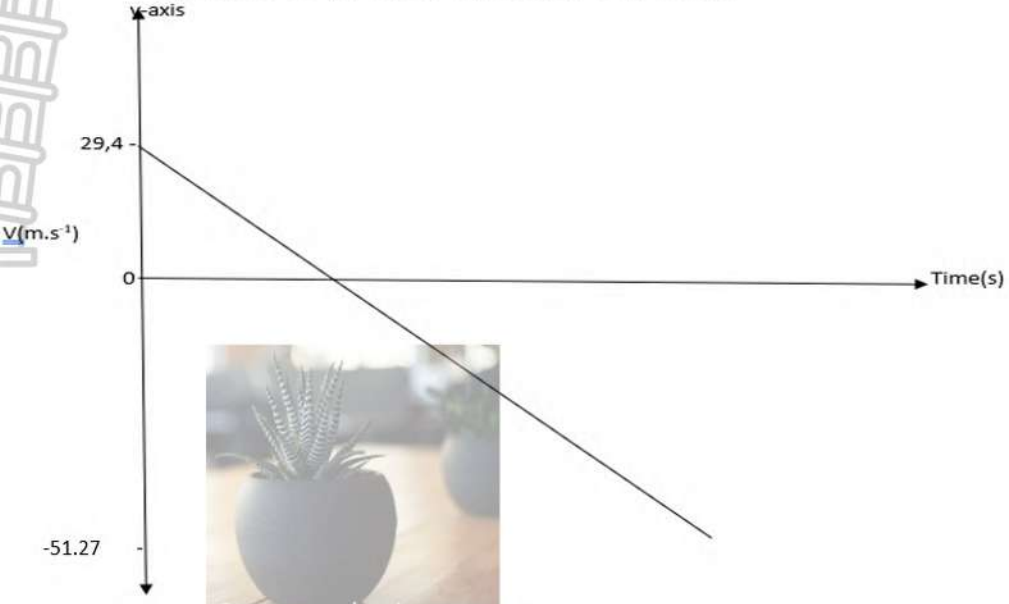
3.3.2 **Positive marking from 3.3.1/*Positiewe nasien van 3.3.1***
$V_f^2 = V_i^2 + 2a\Delta y$✓
$= \underline{(29,4)^2 + 2(-9,8)(-90)}$ ✓
$= -51,27\ m.s^{-1}$
$= 51,27\ m.s^{-1}$ downwards✓/*afwaarts* (3)

3.3.3 **Positive marking from 3.3.2/*Positiewe nasien van 3.3.2***

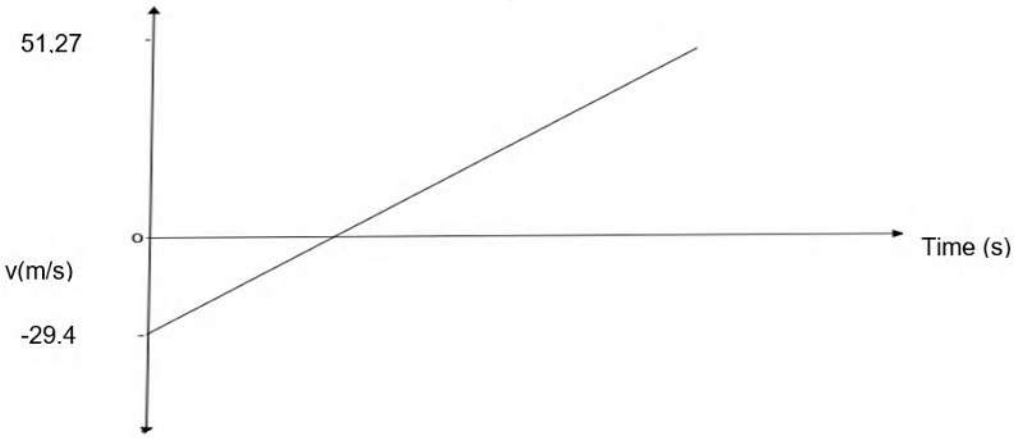
Option 1 /*Opsie 1* (upwards as positive/*opwaarts as positief*)	**Option 2/*Opsie 2*** (upwards as negative/*Opwaarts as negatief*)
$F_{net} = \frac{\Delta P}{\Delta t}$✓ $F_{net} = \frac{m(Vf-Vi)}{\Delta t}$ 130✓ $= \frac{1,2(16,5-(-51,27))}{\Delta t}$✓ $\Delta t = 0,63s$✓	$F_{net} = \frac{\Delta P}{\Delta t}$✓ $F_{net} = \frac{m(Vf-Vi)}{\Delta t}$ -130✓ $= \frac{1,2(-16,5-(51,27))}{\Delta t}$✓ $\Delta t = 0,63s$✓

(4)

3.4 Upwards as positive/*Opwaarts as positief*



Downwards as positive / *Afwaarts as positief*



Criteria /*Kriteria*	**Mark allocation/ *Punte toekenning***
Graph starts at 29,4 m.s^{-1} / *Grafiek begin by 29,4 m.s^{-1}*	✓
Graph stops at 51,27 m.s^{-1}/ *Grafiek stop by 51,27 m.s^{-1}*	✓
Shape (straight line) with a negative/positive gradient / *Vorm (reguit lyn) met 'n negatiewe/positiewe gradiënt*	✓

(3)
[17]

QUESTION 4/ *VRAAG 4*

4.1 Net force/ *Netto krag* (1)

4.2
$\sum p_i = \sum p_f$ ✓
$m_A v_{iA} + m_B v_{iB} = (m_A + m_B)v_f$
$(2)(1,5) + (5)(0)$ ✓ $= (2+5)\, v_f$ ✓
$v_f = 0,43\ m.s^{-1}$ ✓ (4)

4.3
$\sum p_i = \sum p_f$
$m_A v_{iA} + m_B v_{iB} = (m_A + m_B)v_f$
$(2)(2) + (5)(0) = (2+5)\, v_f$ ✓
$v_f = 0,571\ m.s^{-1}$.

$F_{net} = \frac{\Delta P}{\Delta t}$ ✓
$= \frac{m(v_f - v_i)}{\Delta t}$
$= \frac{5(0,571-0)}{(0,25)}$ ✓

= 11, 42 N east/right. ✓ /*oos/regs* (5)

4.4 No ✓/ *Nee*
- the change in velocity/change in momentum/contact time is not the same for the two trails. ✓/ *die verandering in snelheid/die verandering in momentum/kontaktyd is nie dieselfde vir die twee toetslopies nie.* (2)

[12]

QUESTION 5/*VRAAG 5*

5.1

5.1.1 D✓ (1)

5.1.2 B✓ (1)

5.2

5.2.1 4-ethyl-2,2-dimethylhexane /*4-etiel-2,2-dimetielheksaan*

Marking Criteria / *Nasienkriteria*	**Allocation/ *toekenning***
Parent name (**Hexane**) / *Stamnaam (**Heksaan**)*	✓
Two substituents (**ethyl and methyl**)/*Twee substituente (**etiel en metiel**)*	✓
The whole name correct./*Die hele naam korrek.*	✓

(3)

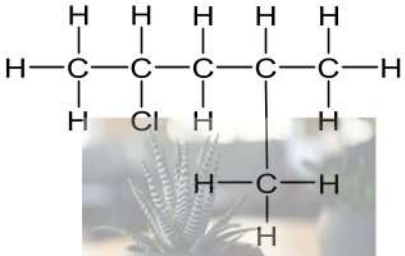
5.2.2 C_nH_{2n+2}✓ (1)

5.2.3 Butanal ✓✓

Marking Criteria/*Nasienkriteria*	**Allocation/ *toekenning***
Parent chain	✓
functional group/name ending with -al	✓

(2)

5.2.4



Marking Criteria/*Nasienkriteria*	**Allocation/ *toekenning***
Chlorine on the second carbon/*Chloor op die tweede koolstof*	✓
Methyl on the fourth carbon/*Metiel op die vierde koolstof*	✓
The whole structure correct./*Die hele struktuur korrek.*	✓

(3)

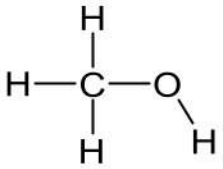
5.3.1 *Structural isomers*- organic compounds with the same molecular formula but different structural formula.
✓✓/*Struktuur isomere - organiese verbindings met dieselfde molekulêre formule maar verskillende struktuur formules.* (2)

5.3.2 Functional ✓ (isomers) /*Funksionele (isomere)* (1)

5.4

5.4.1 Methyl propanoate✓✓ /*Metielpropanoaat* (2)

5.4.2



Marking Criteria/*Nasienkriteria*	**Allocation/ *toekenning***
Hydroxyl group present/*Hidroksielgroep teenwoordig*	✓
The whole structure correct./*Die hele naam korrek*	✓

(2)

5.4.3 Water / H_2O✓ (1)

[19]

QUESTION 6/ *VRAAG 6*

6.1 The pressure exerted by a vapour in equilibrium with its liquid in a closed system. ✓✓ / *Die druk uitgeoefen deur 'n damp in ewewig met sy vloeistof in 'n geslote sisteem.* (2 or/*of* 0) (2)

6.2 Compound B✓/*Verbinding B*

- Both compounds A and B have London forces / dispersion forces / Induced dipole forces ✓ /*Beide verbinding A en B het Londonkragte / dispersie kragte / geÏnduseerde dipoolkragte*
- Compound A has a smaller surface area/ shorter chain length/ more branches than compound B.✓/*Verbinding A het 'n kleiner kontakoppervlakte/ korter kettinglengte/ meer vertakkings as verbinding B*
- Compound A has weak intermolecular forces than compound B.✓/*Verbinding A het swakker intermolekulêre kragte as verbinding B*

OR/*OF*

- Both compounds A and B have London Forces/ dispersion forces / Induced dipole forces. ✓/*Beide verbindings A en B het London kragte / geÏnduseerde dipoolkragte*
- Compound B has a larger surface area/ longer chain length/ less branches than compound A. ✓/*Verbinding B het 'n groter kontakoppervlakte / langer kettinglengte / minder sykettings as verbinding A*
- Compound B has stronger intermolecular forces than compound A. ✓/*Verbinding B het sterker intermolekulêre kragte as verbinding A.*

(4)

6.3
- Both compounds C and D have Hydrogen bonds (in addition to London forces and dipole-dipole) ✓/*Beide verbindings C en D het waterstofbindings (addisioneel tot die London kragte en dipool-dipool)*
- Compound C /propan-1-ol has one site for hydrogen bonding while compound D/ Ethanoic acid has two sites for hydrogen bonding. ✓ / *Verbinding C/propan-1-ol het een plek vir waterstofbindings terwyl verbinding D/etanoësuur twee plekke het vir waterstofbindings*
- The intermolecular forces of compound D are stronger than the intermolecular forces of compound C. ✓/*Intermolekulêre kragte van verbinding D is sterker as die intermolekulêre kragte van verbinding C.*
- More energy will be required to overcome the intermolecular f
- orces of compound D/ Ethanoic acid than that of compound C/ propan-1-ol. ✓ /*Meer energie sal benodig word om die intermolekulêre kragte te oorkom van verbinding D/ etanoësuur as die van verbinding C/propan-1-ol.*

(4)
[10]

QUESTION 7/ *VRAAG 7*

7.1

7.1.1 Elimination/ Dehydrohalogenation/ Dehydrobromination. ✓ /*Eliminasie/Dehidrohalogenering/Dehidrobromering* (1)

7.1.2 But-2-ene ✓✓ /*Butan-2-een* (2)

7.2

7.2.1 Substitution/ Hydrolysis✓/*Substitusie / Hidrolise* (1)

7.2.2

Marking Criteria/*Nasienkriteria*	**Allocation/ *toekenning***
Hydroxyl group present/*Hidroksielgroep teenwoordig*	✓
The whole name correct/*Die hele naam korrek*	✓

(2)

7.2.3 Dilute strong base/NaOH/KOH/LiOH✓ and Mild heat ✓ / *Verdunde sterk basis/ NaOH/KOH/LiOH en matige hitte.* (2)

7.3

7.3.1 Carboxylic acid✓/*Karboksielsuur* (1)

7.3.2

$n=\frac{m}{Mr}$ ✓
$=\frac{6,66}{1}$
= 6,66 mol

$n=\frac{m}{Mr}$
$=\frac{40}{12}$
= 3,33 mol
$n=\frac{m}{Mr}$
$=\frac{53,33}{16}$
= 3,33

2: 1: 1 ✓
CH_2O
Molar mass empirical / *Empiriese molêre massa* = 30 g·mol^{-1}✓

$\frac{molar\ mass}{molar\ mass\ emperical} = \frac{150}{30}$
= 5 ✓
Molecular formula / *Molekulêre formule* = $C_5H_{10}O_5$ ✓ (6)

[15]
TOTAL/*TOTAAL* 100