KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

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PHYSICAL SCIENCES

PROVINCIAL STANDARDISED ASSESSMENT

MARKING GUIDELINES

MARCH 2026

MARKS : 100

These marking guidelines consist of 7 pages.

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QUESTION 1

1.1 D ✓✓ (2)

1.2 C ✓✓ (2)

1.3 C ✓✓ (2)

1.4 B ✓✓ (2)

1.5 A ✓✓ (2)

1.6 B ✓✓ (2)

[12]

QUESTION 2

2.1





(2)

2.2 When a net force acts on an object, 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. ✓

(2)

2.3

Block A	**Block B**
Fnet=ma ✓	T – Fg = ma
Fg – T = ma	T – 5 x 9,8 = 5a ✓… eqn 2.
8 x 9,8 – T = 8a ✓…. eqn 1.	
a = 2, 26 m.s^{-2} ✓	

(4)

2.4 **POSITIVE MARKING FROM 2.3**

$\Delta y = v_i\Delta t + \frac{1}{2} a\Delta t^2$ ✓

$= 0 + \frac{1}{2} \times 2,26 \times 1^2$ ✓

= 1, 13 m

d = 1, 13 + 1, 13 ✓– 0, 3 ✓

= 1, 96 m ✓

(5)

[13]

QUESTION 3

3.1 An object that has been given an initial velocity and then moves under the influence of the gravitational force only. ✓✓ (2)

3.2.1

Upward as positive	**Downward as positive**
$v_f^2 = v_i^2 + 2a\Delta y$ ✓	$v_f^2 = v_i^2 + 2a\Delta y$ ✓
$(-29,36)^2$ ✓$= v_i^2 + \underline{2\,(-9,8)\,(-33)}$✓	$(29,36)^2$ ✓$= v_i^2 + 2\,(9,8)\,(33)$✓
$v_i = 14,67\ m.s^{-1}$ ✓	$v_i = 14,67\ m.s^{-1}$ ✓

(4)

3.2.2

Upward as positive	**Downward as positive**
$v_f^2 = v_i^2 + 2a\Delta y$ ✓	$v_f^2 = v_i^2 + 2a\Delta y$ ✓
$= \underline{(13,77)^2 + 2(-9,8)\,(-12)}$✓	$= (-13,77)^2 + 2(9,8)\,(12)$✓
$v_i = \underline{20,61\ m.s^{-1}, \text{downward}}$ ✓	$v_i = \underline{20,61\ m.s^{-1}, \text{downward}}$ ✓

(3)

3.3 **POSITIVE MARKING FROM 3.2.1 and 3.2.2**

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Time from the roof to the balcony

Upward as positive	**Downward as positive**
$v_f = v_i + a\Delta t$ ✓	$v_f = v_i + a\Delta t$ ✓
$\underline{(-29,36) = 14,67 + (-9,8)\,\Delta t}$ ✓	$\underline{(29,36) = -14,67 + (9,8)\,\Delta t}$ ✓
$\Delta t = 4,49\ s$	$\Delta t = 4,49\ s$

Time from the balcony to the ground

Upward as positive	**Downward as positive**
$v_f = v_i + a\Delta t$	$v_f = v_i + a\Delta t$
$\underline{(-20,61) = 13,77 + (-9,8)\,\Delta t}$ ✓	$\underline{(20,61) = -13,77 + (9,8)\,\Delta t}$ ✓
$\Delta t = 3,51\ s$	$\Delta t = 3,51\ s$

Contact time: $\underline{8,2 - (4,49 + 3,51)}$ ✓$= 0,2\ s$

$$Fnet = \frac{m(v_f - v_i)}{\Delta t}$$ ✓

$$Fnet = \frac{0,3(13,77 - (-29,36))}{0,2}$$ ✓

Fnet = $\underline{64,70\ N, \text{upward}}$ ✓ (7)

[16]

QUESTION 4

4.1 The total linear momentum of an isolated system is conserved. ✓✓ (2)

4.2 $\sum p_{before} = \sum p_{after}$

$m_A v_{Ai} + m_B v_{Bi} = m_A v_{Af} + m_B v_{Bf}$ ✓

$0 + \underline{(1100 \times 19)}$ ✓ $= \underline{(900 \times 10) + 1100 v_{Bf}}$ ✓

$V_f = \underline{10,82\ m.s^{-1}, \text{ to the right}}$ ✓ (4)

4.3 Crumple zones <u>increase the collision time</u>✓, which <u>reduces the net force</u> ✓experienced by the cars. (2)

4.4 **POSITIVE MARKING FROM 4.2**

$\sum$ Ek before $= ½ m_A v_{Ai}^2 + ½ m_B v_{Bi}^2$ ✓

$= 0 + \underline{½ \times 1100 \times 19^2}$ ✓

$= 198550$ J

$\sum$ Ek after $= ½ m_A v_{Af}^2 + ½ m_B v_{Bf}^2$

$= \underline{½ \times 900 \times 10^2 + ½ \times 1100 \times (10,82)^2}$ ✓

$= 109389,82$ J

$\sum$ Ekbefore $\neq \sum$ Ekafter ✓

Collision is INELASTIC ✓ (5)

4.5 Newton's third law: Both cars experience equal force. ✓
Newton's second law: Acceleration is inversely proportional to the mass. ✓
Therefore, a heavier car experiences smaller acceleration than a lighter car. (2)

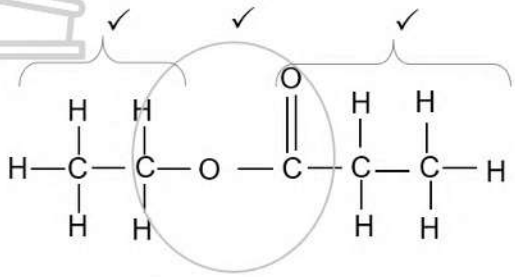
[15]

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QUESTION 5

5.1 A series of organic compounds that can be described by the same general formula. ✓✓ (2)

5.2 Esters. ✓ (1)

5.3  (3)

5.4.1 F ✓ (1)

5.4.2 A ✓ (1)

5.5.1 2-methylpentan-3-one ✓✓ (2)

5.5.2 2-methylbutan-2-ol ✓✓ (2)

5.5.3 $2C_4H_{10} + 13O_2$ ✓→ $8CO_2 + 10H_2O$ ✓ Bal. ✓ (3)

[15]

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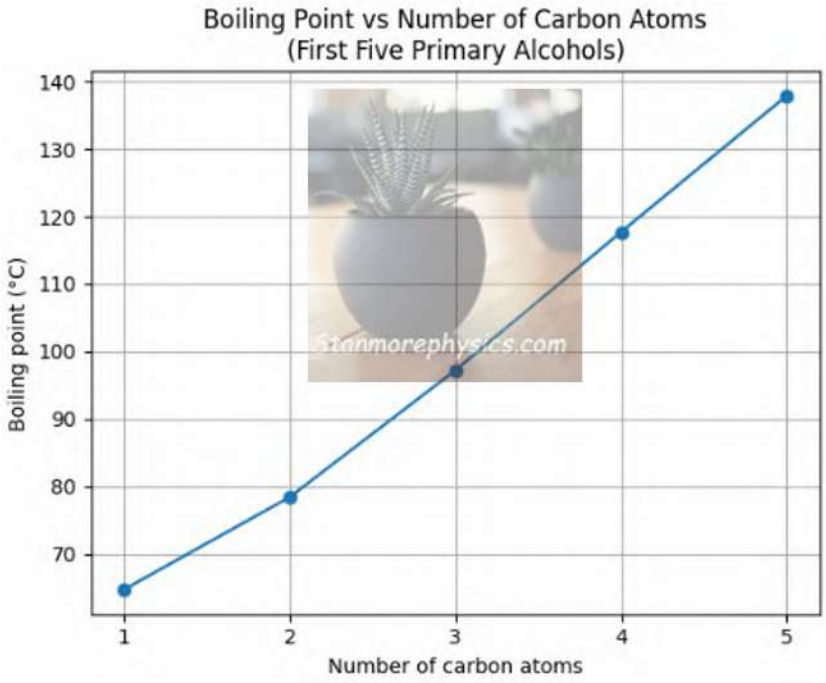
QUESTION 6

6.1 Hydroxyl (group) ✓ (1)

6.2 The temperature at which the vapour pressure of a substance equals the atmospheric pressure. ✓✓ (2)

6.3
- Pentan-1-ol. ✓
- It has the lowest vapour pressure. ✓
- It produces fewer flammable vapours at room temperature, which reduces the risk of ignition. ✓ (3)

6.4.1



Marking criteria:

- Both axes correctly labelled with appropriate scale: ✓
- All five points plotted accurately: ✓✓
- Graph with a positive gradient: ✓

(4)

6.4.2 The boiling point increases as the number of carbon atoms/chain length/surface area/molecular mass increases. ✓✓ (2 or 0) (2)

6.4.3 As the number of carbon atoms increases,

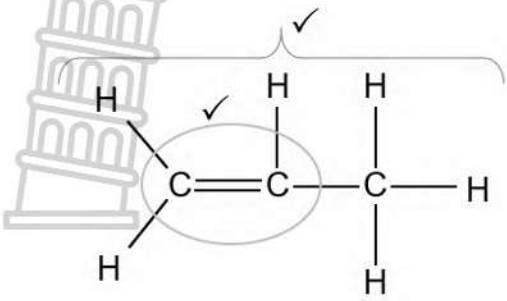
the London/Dispersion forces ✓ get stronger. ✓

More energy is required to overcome the intermolecular forces. ✓ (3)

[15]

QUESTION 7

7.1

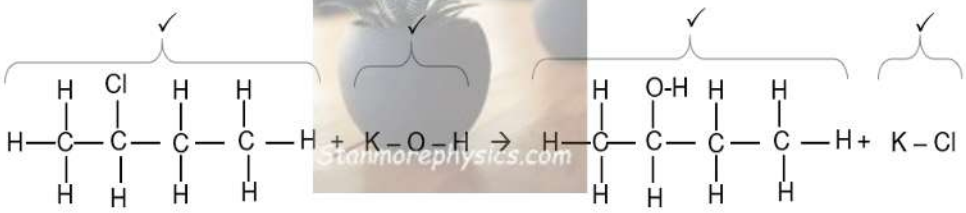


(2)

7.2.1 Heat or Light ✓ (1)

7.2.2 Secondary. ✓
The carbon atom bonded to the halogen/Cl is attached to two other carbon atoms (in the compound). ✓ (2)

7.2.3



(4)

7.3.1 Dehydrohalogenation. ✓ (1)

7.3.2 But-2-ene ✓✓ (2 or 0) (2)

7.3.3 KCl ✓ and H_2O ✓ (2)

[14]

TOTAL MARKS: [100]

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