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**SA EXAM
PAPERS**

QUESTION 1

1.1 B ✓✓ (2)

1.2 D ✓✓ (2)

1.3 D ✓✓ (2)

1.4 C ✓✓ (2)

1.5 C ✓✓ (2)

1.6 A ✓✓ (2)

1.7 A ✓✓ (2)

1.8 B ✓✓

[14]

QUESTION 2

2.1



(3)

2.2

2.2.1 On 3 kg block

$$\left. \begin{array}{l} F_{\text{net}} = ma \\ T - W = ma \end{array} \right\} \checkmark$$

$$T - (3)(9.8) = (3)(2.2) \checkmark$$

$$T = 36 \text{ N} \checkmark$$

(3)

2.2.2 On 5 kg block

$$\left. \begin{array}{l} F_{\text{net}} = ma \\ F_x - T - f_k = ma \end{array} \right\} \checkmark$$

$$80 \cos 30^\circ - 36 - \mu_k (5 \times 9.8 + 80 \sin 30^\circ) = 5(2.2) \checkmark$$

$$\mu_k = 0.25 \checkmark$$

(5)

2.3

2.3.1 Increase \checkmark

According to ($f_k = \mu_k N$), at a constant coefficient of kinetic friction, kinetic frictional force increases as normal forces increases. \checkmark

ORIncrease \checkmark

Normal force is directly proportional to kinetic frictional force. \checkmark

(2)

2.3.2 Remain the same. \checkmark

Coefficient of kinetic friction depend on the nature of the surface only. \checkmark

(2)

[15]

QUESTION 3

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

3.2

3.2. **OPTION 1****OPTION 2**

1

upwards as positive**downwards as positive**

$$V_f^2 = V_i^2 + 2a\Delta y \checkmark$$

$$V_f^2 = V_i^2 + 2a\Delta y \checkmark$$

$$= (-10)^2 + 2(-9,8)(-13) \checkmark$$

$$= (10)^2 + 2(9,8)(13) \checkmark$$

$$= 18,84 \text{ m.s}^{-1} \text{ downwards} \checkmark$$

$$= 18,84 \text{ m.s}^{-1} \text{ downwards} \checkmark \quad (3)$$

3.2. **POSITIVE MARKING FROM QUESTION 3.2.1**

2

OPTION 1**OPTION 2**

downwards as positive

upwards as positive

$$\begin{aligned} F_{\text{net}} \Delta t &= \Delta p \\ F_{\text{net}} \Delta t &= m(v_f - v_i) \checkmark \end{aligned}$$

$$\begin{aligned} F_{\text{net}} \Delta t &= \Delta p \\ F_{\text{net}} \Delta t &= m(v_f - v_i) \checkmark \end{aligned}$$

$$F_{\text{net}}(0,3) = 200 \times 10^{-3}(-24 - 18,84) \checkmark$$

$$F_{\text{net}}(0,3) = 200 \times 10^{-3}(24 - (-18,84)) \checkmark \quad (4)$$

$$F_{\text{net}} = -28,56 \text{ N}$$

$$18,84)) \checkmark$$

$$F_{\text{net}} = 28,56 \text{ N} \checkmark$$

$$F_{\text{net}} = 28,56 \text{ N} \checkmark$$

3.3

OPTION 1**OPTION 2****upwards as positive****downwards as positive****For ball A****For ball A**

$$\Delta y = V_i \Delta t + \frac{1}{2} a \Delta t^2 \checkmark$$

$$\Delta y = V_i \Delta t + \frac{1}{2} a \Delta t^2 \checkmark$$

$$\Delta y = 0 + \frac{1}{2}(-9,8)\Delta t^2 \checkmark \quad \dots (1)$$

$$-\Delta y = 0 + \frac{1}{2}\{+(9,8)\Delta t^2 \checkmark \quad \dots (1)$$

For ball B**For ball B**

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

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

$$-[(30-2) - \Delta y] = -15\Delta t + \frac{1}{2}(-9,8)\Delta t^2$$

$$[(30-2) - \Delta y] = 15\Delta t + \frac{1}{2}(9,8)\Delta t^2$$

.... (2)

...(2)

(1) Into (2)

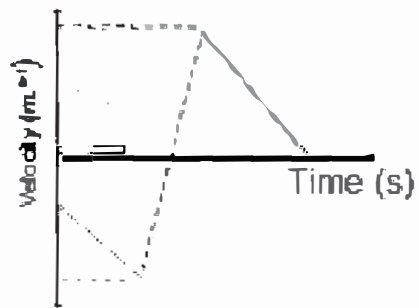
(1) Into (2)

$$t = 1,87 \text{ s} \checkmark$$

$$t = 1,87 \text{ s} \checkmark$$

3.4 **OPTION 1**

upwards as positive

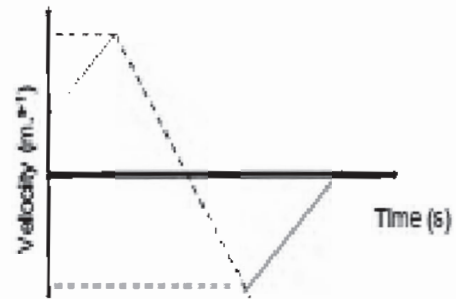


shape : ✓

label both axis : ✓

OPTION 2

Downwards as positive



shape : ✓

label both axis : ✓

(2)

[16]

QUESTION 4

4.1 The total linear momentum of an isolated system remains constant. ✓✓ (2)

4.2 $\Sigma p_i = \Sigma p_f$

$$m_c v_{ic} + m_t v_{it} = m_c v_{fc} + m_t v_{ft} \quad \checkmark$$

$$(1500)(-20) + (2600)(16) \checkmark = (1500)(5,2) + (2600) v_{ft} \checkmark \quad (4)$$

$$v_{ft} = 1,46 \text{ m.s}^{-1} \text{ eastwards. } \checkmark$$

4.3 Inelastic ✓

POSITIVE MARKING FROM QUESTION 4.2

$$\Sigma E_{k\text{before}} = \frac{1}{2} m_c v_{ic}^2 + \frac{1}{2} m_t v_{it}^2 \quad \checkmark$$

$$= \frac{1}{2}(1500)(20)^2 + \frac{1}{2}(2600)(16)^2 \quad \checkmark$$

$$= 622800 \text{ J}$$

$$\Sigma E_{k\text{after}} = \frac{1}{2} m_c v_{fc}^2 + \frac{1}{2} m_t v_{ft}^2$$

$$= \frac{1}{2}(1500)(5,2)^2 + \frac{1}{2}(2600)(1,46)^2 \quad \checkmark \quad (5)$$

$$= 23051 \text{ J}$$

$$\Sigma E_{k\text{before}} \neq \Sigma E_{k\text{after}} \quad \checkmark$$

4.4 Car ✓

It experiences a greater acceleration OR It has a greater change in velocity ✓ (2)

[13]

QUESTION 5

5.1 Organic molecules. ✓ (1)

5.2

5.2.1 C✓ (1)

5.2.2 F✓ (1)

5.2.3 B✓ (1)

5.2.4 D✓ (1)

5.2.5 E✓ (1)

5.3.1 ✓✓ (2)



5.3.2 Propanol ✓✓ (2)

5.4

4 – bromo – 2,2 – dimethyl pentane ✓✓✓ (3)

5.5 Primary alcohol. ✓

The carbon atom bonded to the hydroxyl (-OH) group is directly bonded to only one other carbon atom. ✓

(2)

5.6 $2C_2H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O$ ✓ ✓ balancing. (3)

[18]

QUESTION 6

- 6.1 The temperature at which the vapour pressure ✓ of a substance equals the atmospheric pressure. ✓ (2)
- 6.2
- 6.2.1 Number of carbons/ chain length. ✓ (1)
- 6.2.2 What is the relationship between the number of carbon atoms/ chain length and the boiling point? ✓✓ (2)
- 6.2.3 As the number of carbon atoms / chain length increases, the boiling point also increases. ✓✓ (2)
- 6.3
- Alkanes have London forces. ✓
 - Alcohols have London forces Dipole-dipole forces and hydrogen bonds. ✓ (4)
 - The intermolecular forces of alcohols are stronger than those of alkanes. ✓
 - More energy needed to overcome the intermolecular forces of alcohols. ✓

[11]

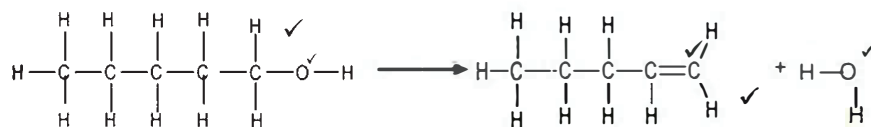
QUESTION 7

7.1

7.1.1 Elimination ✓

(1)

7.1.2



Functional group: ✓

Functional group: ✓

Whole structure correct: ✓

Whole structure: ✓

Water ✓

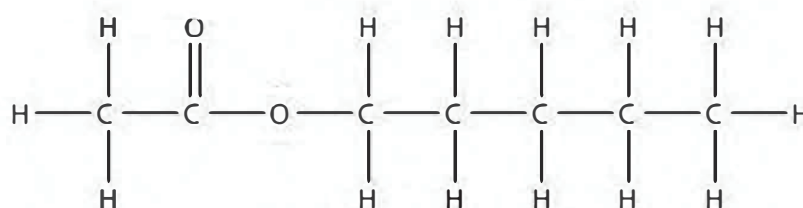
(5)

7.2

7.2.1 Esterification ✓

(1)

7.2.2



✓ functional group

✓ structure

(2)

7.3

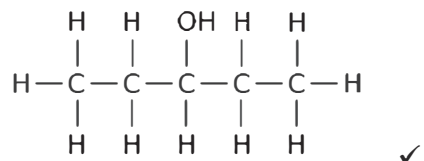
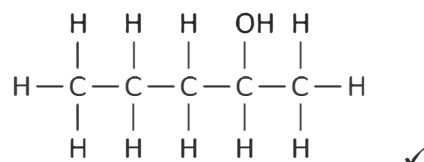
7.3.1 Substitution ✓

(1)

7.3.2 1-bromopentane ✓✓

(2)

7.4



(2)

[14]**TOTAL [100]**