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)

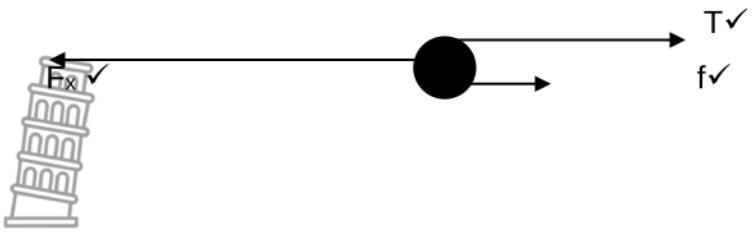
1.8 B ✓✓

[14]



QUESTION 2

2.1



(3)

2.2

2.2.1 <u>On 3 kg block</u>

$F_{net} = ma$ ✓

$T - W = ma$

$T - (3)(9.8) = (3)(2.2)$ ✓

$T = 36\ N$✓ (3)

2.2.2 <u>On 5 kg block</u>

$F_{net} = ma$

$F_x - T - f_k = ma$ ✓

✓ ✓

$80\cos 30° - 36 - \mu_k(5\times 9.8 + 80\sin 30°) = 5(2.2)$ ✓

$\mu_k = 0.25$✓ (5)

2.3

2.31 Increase ✓

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

OR

Increase ✓

Normal force is directly proportional to kinetic frictional force. ✓ (2)

2.3.2 Remain the same. ✓

Coefficient of kinetic friction depend on the nature of the surface only. ✓ (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



3.2.1

OPTION 1	**OPTION 2**
upwards as positive	**downwards as positive**
$V_f^2 = V_i^2 + 2a\Delta y$✓	$V_f^2 = V_i^2 + 2a\Delta y$✓
$= (-10)^2 + 2(-9,8)(-13)$ ✓	$= (10)^2 + 2(9,8)(13)$ ✓
$= 18,84$ m.s^{-1} downwards✓	$= 18,84$ m.s^{-1} downwards✓

(3)

3.2.2 **POSITIVE MARKING FROM QUESTION 3.2.1**

OPTION 1	**OPTION 2**
downwards as positive	upwards as positive
$F_{net}\,\Delta t = \Delta p$ $F_{net}\,\Delta t = m(v_f - v_i)$ ✓	$F_{net}\,\Delta t = \Delta p$ $F_{net}\,\Delta t = m(v_f - v_i)$ ✓
✓ ✓ $F_{net}(0,3) = 200\times10^{-3}(-24 - 18,84)$ ✓	✓ ✓ $F_{net}(0,3) = 200\times10^{-3}(24 - (-18,84))$ ✓
$F_{net} = -28,56$ N	
$F_{net} = 28,56$ N ✓	$F_{net} = 28,56$ N ✓

(4)

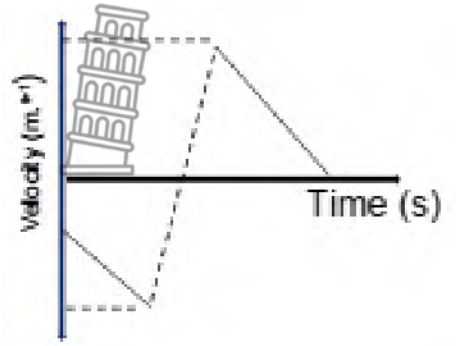
3.3

OPTION 1	**OPTION 2**
upwards as positive	**downwards as positive**
For ball A	**For ball A**
$\Delta y = V_i\Delta t + \frac{1}{2}a\Delta t^2$✓	$\Delta y = V_i\Delta t + \frac{1}{2}a\Delta t^2$✓
$\Delta y = 0 + \frac{1}{2}(-9,8)\Delta t^2$✓ **…. (1)**	$-\Delta y = 0 + \frac{1}{2}\{+(9,8)\Delta t^2$✓ …. (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)
$t = 1,87$ s ✓	$t = 1,87$ s ✓

(5)

3.4 **OPTION 1**

upwards as positive

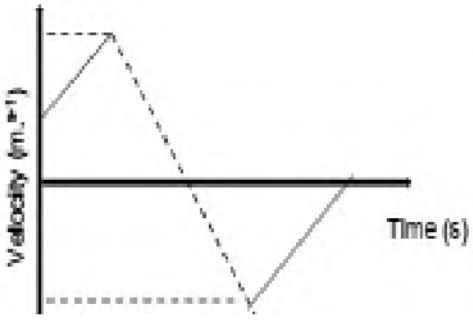


shape : ✓

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 $\Sigma p_i = \Sigma p_f$

$m_c v_{ic} + m_t v_{it} = m_c v_{fc} + m_t v_{ft}$ ✓

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

$v_{ft} = 1,46\ m.s^{-1}$ easwards. ✓ (4)

4.3 Inealstic ✓

POSITIVE MARKING FROM QUESTION 4.2

$\Sigma Ek_{before} = \frac{1}{2} m_c v^2_{ic} + \frac{1}{2} m_t v^2_{it}$ ✓

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

$= 622800$ J

$\Sigma E_{kafter} = \frac{1}{2} m_c v^2_{fc} + \frac{1}{2} m_t v^2_{ft}$

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

$= 23051$ J

$\Sigma Ek_{before} \neq \Sigma E_{kafter}$ ✓

4.4 Car ✓

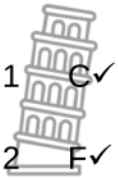
It experiences a greater acceleration OR It has a greater change in velocity ✓ (2)

[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 $2C_2H_6 + 7O_2$ ✓ ⟶ $4CO_2 + 6H_2O$ ✓ ✓ 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. ✓

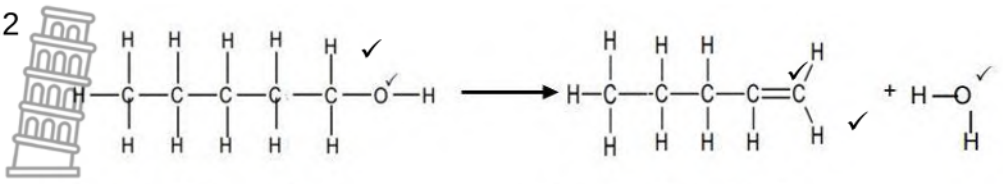
[11]

QUESTION 7

7.1

7.1.1 Elimination ✓ (1)

7.1.2



Functional group: ✓ Functional group: ✓

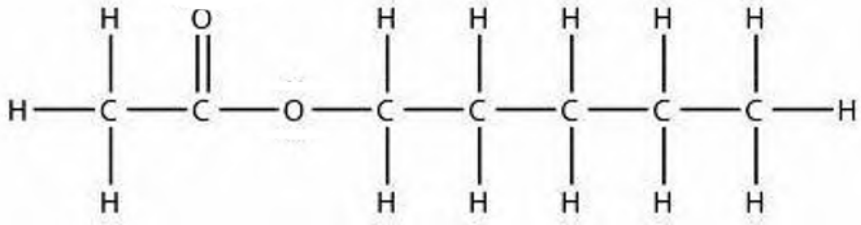
Whole structure correct: ✓ Whole structure: ✓

Water ✓ (5)

7.2

7.2.1 Esterification ✓ (1)

7.2.2



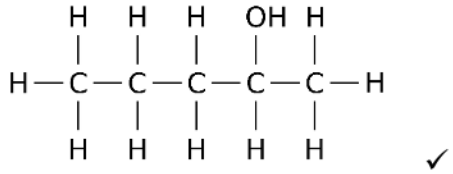
✓ functional group ✓ structure (2)

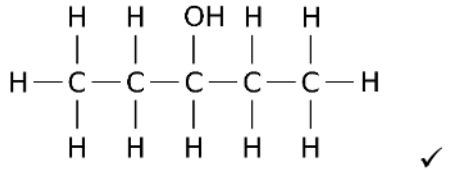
7.3

7.3.1 Substitution ✓ (1)

7.3.2 1-bromopentane ✓✓ (2)

7.4





(2)

[14]

TOTAL [100]