GRADE 12

PHYSICAL SCIENCES: TERM TEST 1
MEMORANDUM
14 MARCH 2016

MARKS: 100

NAME OF SCHOOL: ……..

This memorandum consists of 6 pages including this cover page

QUESTION 1

1.1. A ✓✓ (2)
1.2. A.✓✓ (2)
1.3. C✓✓ (2)
1.4. C✓✓ (2)
1.5. C.✓✓ (2) [10]

QUESTION 2

2.1. AN object moving /motion under the influence of weight/force of gravity only✓ and there are no other forces such as friction. ✓ (2)
2.2. 12 m✓ (2)

2.3.1.

OPTION 1 Upwards positive	OPTION 2 Downwards positive

$v_f^2 = v_i^2 + 2a\Delta y$✓ 25^2✓$= v_i^2 + 2(-9{,}8)(-30)$ ✓ $v_i = 6{,}08\ m \cdot s^{-1}$✓ (4)	$v_f^2 = v_i^2 + 2a\Delta y$ $(-25)^2 = v_i^2 + 2(9{,}8)(30)$ $v_i = 6{,}08\ m \cdot s^{-1}$

2.3.2.

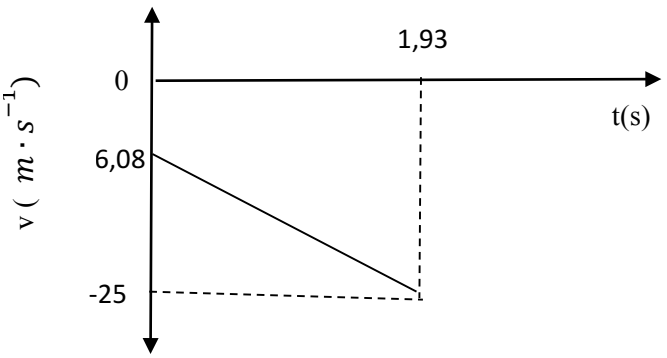
OPTION 1 Upwards is positive $v_f = v_i + a\Delta t$✓ $-25 = -6{,}08 + (-9{,}8)\Delta t$✓ $\Delta t = 1{,}93\ s$✓ (3)	OPTION 2 Downwards is positive $v_f = v_i + a\Delta t$ $25 = 6{,}08 + (9{,}8)\Delta t$ $\Delta t = 1{,}93\ s$
OPTION 3 Upwards is positive $\Delta y = v\Delta t^2 + \frac{1}{2} a\ t^2$ $-30 = -6{,}08\ \Delta t + \frac{1}{2}(-9{,}8)\ t^2$ $\Delta t = 1{,}93\ s$	OPTION 4 Downwards is positive $\Delta y = v\Delta t^2 + \frac{1}{2}(-9{,}8)\ t^2$ $30 = 6{,}08\ \Delta t + \frac{1}{2}(9{,}8)\ t^2$ $\Delta t = 1{,}93\ s$

2.3. 3.

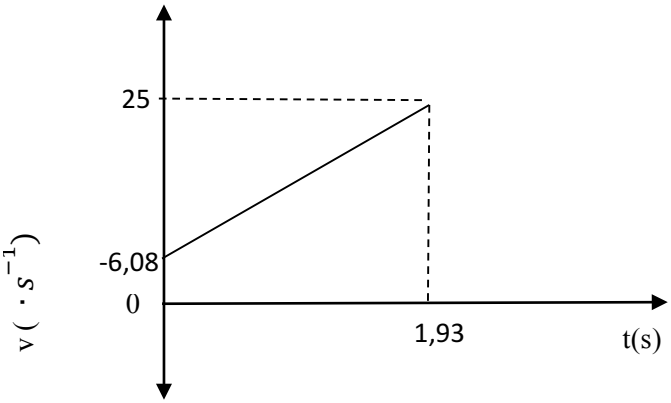
OPTION 1 Upwards positive $v_f^2 = v_i^2 + 2a\Delta y$✓ 0✓$= v_i^2 + 2(-9{,}8)(12)$ ✓ $v_i = 15{,}34\ m \cdot s^{-1}$✓ $v_f = v_i + a\Delta t$ $0 = 15{,}34 + (-9{,}8)\Delta t$ ✓ $\Delta t = 1{,}57s$ ✓ Total time taken = (1,9 +1,57) =4,3 s✓ (6)	OPTION 2 Downwards positive $v_f^2 = v_i^2 + 2a\Delta y$ $0 = v_i^2 + 2(9{,}8)(-12)$ $v_i = 15{,}34\ m \cdot s^{-1}$ $v_f = v_i + a\Delta t$ $0 = -15{,}34 + (9{,}8)\Delta t$ $\Delta t = 1{,}57s$ Total time taken = (1,9 +1,57) =4,3 s

2.4. Do **POSITIVE MARKING** from 2.3.1, 2.3.2 and 2.3.3

CONSIDER UPWARD AS POSITIVE



CONSIDER DOWNWARD POSITIVE



Criteria	Marks
Graph starts at correct Initial velocity as shown	1
Time to reach the ground	1
Final velocity shown	1
Shape from t = 0 to t = 1,93s	1
	(4)

[21]

QUESTION 3

3.1. The total linear momentum in an isolated system is conserved. ✓✓ (2)

3.2.1. $P = mv$ ✓

$= (0{,}15)(40)$ ✓

$= 6\ kgm \cdot s^{-1}$ *To the right*✓ (3)

3.2.2. $P = mv$

$= (0{,}15)(-25)$✓

$= -3{,}75\ kgm \cdot s^{-1}$

$= 3{,}75\ kgm \cdot s^{-1}$ *To the left*✓ (3)

3.2.3.

OPTION 1	OPTION 2
$F_{net}\Delta t = \Delta P$✓ $F_{net}0{,}4 = -3{,}75 - 6$✓ $F_{net} = -24{,}38\ N$ $F_{net} = 24{,}38\ N$ *To the left*✓(3)	$F_{net}\Delta t = m(v_f - v_i$ $F_{net}0{,}4 = 0{,}15((-25) - 40)$ $F_{net} = -24{,}38\ N$ $F_{net} = 24{,}38\ N$ *To the left*

3.3. For the same momentum change✓, a decrease in the contact time will lead to an increase in the net force. ✓ (2)

3.4. Some energy is converted to sound energy✓. Total kinetic energy is not

conserved, thus collision is inelastic. ✓ (2)

[15]

QUESTION 4

4.1. Higher (1)

4.2. Alcohols have hydrogen bonds that are stronger than van der Waals forces of the alkanes. ✓ The hydrogen bonds need more energy to be broken✓; therefore the alcohols have higher boiling points than the corresponding alkanes. ✓ (3)

4.3. Methanol✓ (1)

4.4. Is the smallest molecule/lower molecular mass.
Boiling points corresponds with molecular mass of the molecule. ✓
The intermolecular forces increase in strength if the mass/chain of the molecule increases thus the surface area is increased. ✓
The stronger the intermolecular forces the more energy is needed to break the bonds. ✓ (3)

[8]

QUESTION 5

5.1. Propyl ethanoate✓ (1)

5.2.1. Sulphuric acid✓ / H_2SO_4 (1)

5.2.2. Ethanoic acid✓ (1)

5.2.3. Propan -1- ol✓/Propanol (1)

5.2.4. Alcohols are flammable and should not be left near open flame✓ (1)

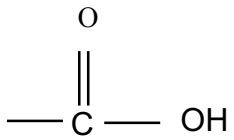
5.2.5. Dehydrating ✓ (1)

5.2.6. H_2O✓ (1)

[7]

QUESTION 6

6.1.1.



(2)

6.1.2. 4 – chloro,1 – fluoro – ✓3 - methylpentane✓ (2)

6.1.3. propene✓ (1)

6.1.4. C_nC_{2n-2}✓✓ (2)

6.1.5. Methanol✓ and butanoic acid✓ (2)

6.1.6. haloalkanes/ halogenoalkane✓✓ (2)

6.1.7. Alcohol✓✓ (2)

6.2.1. Dehydration/ Elimination✓
Catalyst H_2SO_4 / H_3PO_4✓ (2)

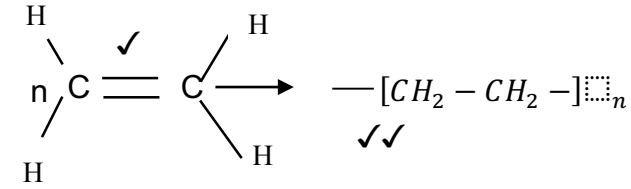
6.2.2. Dehydrohalogenation / elimination✓
[Use hot alcoholic KOH/NaOH] ✓
Use strong base in alcohol and heat (2)

6.2.3. Addition/hydrogenation (2)

6.3.1. Small organic molecules that can be covalently bonded to each other in a repeating pattern. ✓✓/ A repeating unit in a polymer. (2)

6.3.2. A chemical reaction in which monomer molecules join to form a polymer. ✓✓ (2)

6.3.3.



NOTE: Must include the n's
Deduct 1 mark if n is left

Polythene/polyethene/polythylene✓✓ (5)

[28]

QUESTION 7

7.1.1 Functional group. ✓ (1)

7.1.2 Number of carbon atoms. ✓ (1)

7.2. Melting point increases from A-C✓✓ (2)

7.3. Compound A has weak Van der Waal's ✓ forces whilst B and C have strong hydrogen bonds between their molecules ✓ hence less energy is needed to break bonds in A than in B and C. Compound B has one side of hydrogen bonding while C has two sites of hydrogen bonding thus C has stronger intermolecular forces than B.
More energy needed to break bonds in C than in B.✓ (3)

7.4.1. Bromine water✓ (1)

7.4.2. (1) Add few drops of bromine water into each test tube✓.

(2) Let the test tube stand on the test rack for few minutes. ✓

(3) Observing THE RATE AT WHICH THE COLOUR FADES in each of the test tubes. ✓ (3)

[11]