education

DEPARTMENT: EDUCATION
MPUMALANGA PROVINCE

GRADE 12

PHYSICAL SCIENCES MONTHLY TEST

APRIL 2020

TOPIC: ORGANIC MOLECULES

MEMORANDUM

MARKS: 55

This memorandum consists of 4 pages

QUESTION 1

1.1 D✓✓ (2)

1.2 C✓✓ (2)

1.3 A✓✓ (2)

1.4 C✓✓ (2)

1.5 B✓✓ (2)

[10]

QUESTION 2

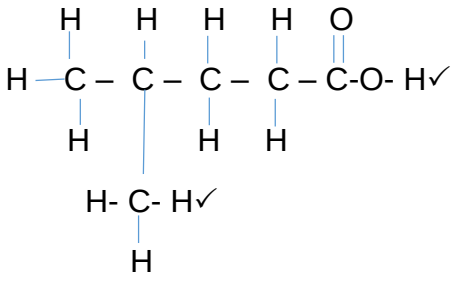
2.1 B✓✓ (2)

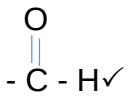
2.2 A✓ (1)

2.3 Chloroethene✓✓(OR 1-Chloroethene) (2)

2.4 H✓ (1)

2.5 Carboxylic acid✓ (1)

2.6  (2)

2.7  (1)

[10]

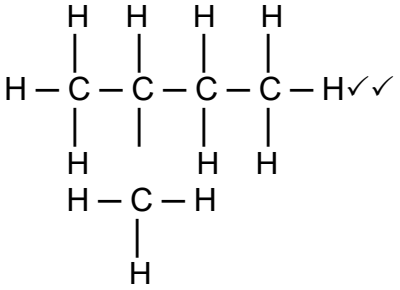
QUESTION 3

3.1.1 Boiling does not involve breaking the chemical (intra molecular) bonds between atoms.✓ OR Boiling involves overcoming the intermolecular forces between molecules. (1)

3.1.2 The longer chain in pentane provides greater surface area with stronger London forces. ✓
More energy is required to overcome the stronger forces.✓ (2)

3.1.3 **OPTION 1:**

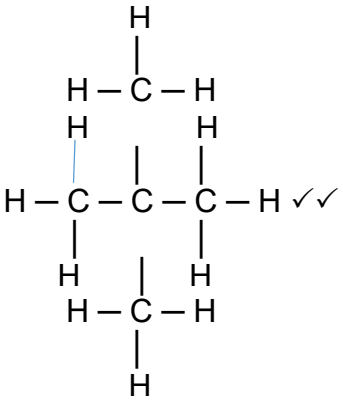
2-methylbutane✓
(or methyl butane)



✓✓

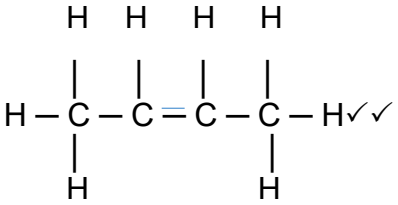
OPTION 2:

2,2-dimethylpropane✓
(or dimethyl propane)



✓✓ (3)

3.2



✓✓ (2)

3.3 A series of organic compounds that can be described by the same general formula OR in which one member differs from the next with a CH_2 group.✓ ✓ (2)

3.4.1 B✓ (1)

3.4.2 A✓ (1)

3.5 - increase in branching (in A) makes the molecule more spherical (compact) with less surface area over which the London forces work.✓

- This decreases the strength of London forces (in A). ✓
- Less energy is required to overcome the London forces (in A). ✓
- There will be more molecules/ higher vapour pressure above the surface of the substance (A). (3)

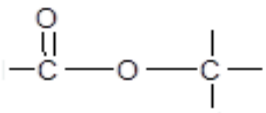
3.6.1 D (1)

3.6.2 C (1)

[17]

QUESTION 4

4.1.1 Esterification / Condensation ✓ (1)

4.1.2  ✓ (1)

4.1.3 Propanoic acid ✓ (1)

4.2.1

Element	C	H	O
$n = \frac{m}{M}$ ✓	$\frac{3.758}{12}$ ✓ = 0.313	$\frac{0.316}{1}$ ✓ = 0.316	$\frac{1.251}{16}$ ✓ = 0.078
Divide by smallest	= 1 = 4	= 1 = 4	= o,24 (x4) = 1 ✓
Empirical formula:	C_4H_4O ✓		

(6)

4.2.2 $(C_4H_4O)_n = 136$

$(12x4 + 1x4 + 16)_n = 136$

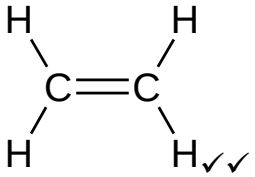
n = 2

Molecular formula = $C_8H_8O_2$ ✓✓ (2)

4.3.1 Dehydration / Elimination ✓ (1)

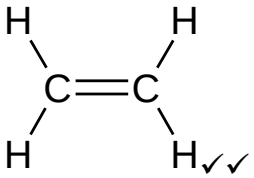
4.3.2 Concentrated sulphuric acid / H_2SO_4 / Phosphoric acid / H_2PO_4 ✓ (1)

4.3.3



✓✓ (2)

4.4.1



✓✓ (2)

4.4.2 Addition✓ (1)

[18]

TOTAL: 55