# P.2 MEMO JUNE 2013

## PHYSICAL SCIENCES GRADE 12

### QUESTION 1

1.1 Aldehydes (1)

1.2 Catalyst (1)

1.3 Effective (1)

1.4 Isomers (1)

1.5 Alkynes (1)

**[5]**

### QUESTION 2

| | | | | |
|---|---|---|---|---|
| 2.1 | A | B | ~~C~~ | D |
| 2.2 | A | B | C | ~~D~~ |
| 2.3 | A | B | ~~C~~ | D |
| 2.4 | A | B | ~~C~~ | D |
| 2.5 | ~~A~~ | B | C | D |

**[5 X 2 = 10]**

**TOTAL SECTION A : 15 MARKS**

### QUESTION 3

3.1.1 Changed the **concentration** of the reactant(s) ✓✓

3.1.2 Increasing the concentration will **increase the number of molecules present with energy greater than the activation energy**, This will result in **more effective collisions** taking place **per unit time**, causing the reaction rate to increase. ✓✓✓

3.2.1 Added a catalyst ✓✓

3.2.2 By adding a catalyst, the **activation energy is lowered**. This results in a **larger portion of the molecules having energy greater than the activation energy**. This results **in more effective collisions per second**. ✓✓✓

3.2.3 EXOthermic ✓

**[11]**

## QUESTION 4

4.1 Sulfuric acid ✓✓

4.2.1 CONCENTRATION ✓✓

4.2.2 PRESSURE ✓✓

4.2.3 TEMPERATURE ✓✓

4.3 Equilibrium ✓✓

4.4 ICE TABLE:

| | $2SO_2$ | $O_2$ | $2SO_3$ |
|---|---|---|---|
| **I** | **10** | **8** | **0** |
| **C** | **-8** | **-4** | **+8** |
| **E** | **2** | **4** | **8** |
| **Conc** | **0.2** | **0.4** | **0.8** |
| | ✓ | ✓ | ✓ |

n = m/M = 128/32 = 4 ✓✓✓

$Kc = [SO_3]^2 / [SO_2]^2.[O_2] = (0.8)^2 / (0.2)^2.(0.4) = 40$ ✓✓✓

**[19]**

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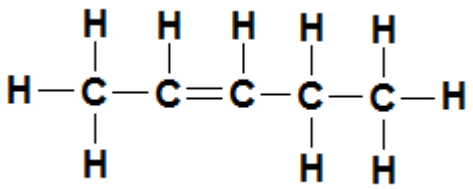
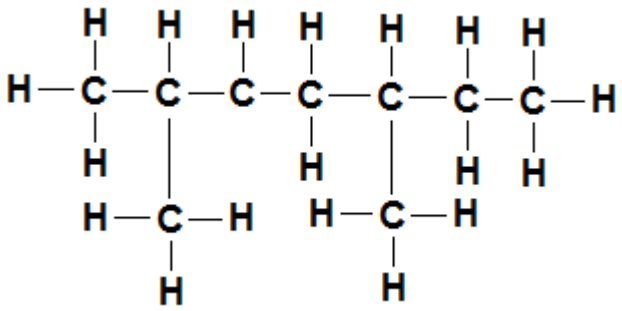
## QUESTION 5

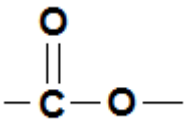
5.1.1 E ✓
5.1.2 A ✓
5.1.3 A ✓
5.1.4 F ✓
5.1.5 D ✓
5.1.6 C ✓

5.2.1 ✓✓



5.2.2 ✓✓



5.3  ✓

5.4 3-methylpropan-1ol ✓✓✓

**[9]**

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## QUESTION 6

6.1.1 Gas ✓

6.1.2 Lower than: More branching, Smaller contact surface area, weaker IMF's, less energy required to overcome IMFs ✓✓✓✓

6.1.3 $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$ ✓✓✓

6.1.4 compound B contains a carbonyl group (POLAR) = dipole – dipole forces ✓✓

6.2.1 C = only 1 H-bond, D = 2 H-bonds ✓✓

6.2.2 C, has a lower boiling point ✓✓

**[14]**

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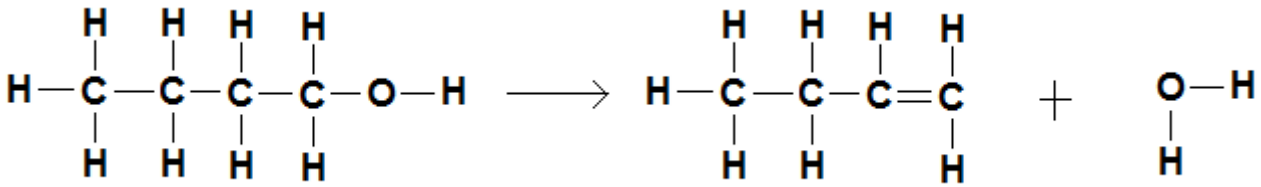
## QUESTION 7

7.1 PRIMARY ✓

7.2.1 Elimination ✓✓

7.2.2 ✓✓✓✓✓

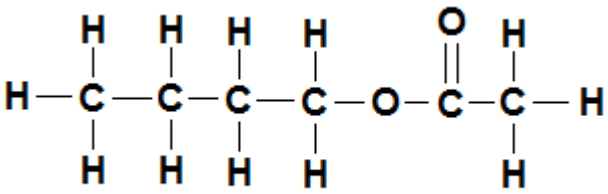


7.3.1 Substitution ✓

7.3.2 1-Bromobutane ✓✓

7.4.1 Esterification ✓✓

7.4.2 Butylethanoate ✓✓✓✓✓



**QUESTION 8**

8.1.1 Measure the volume of hydrogen gas produced ✓

8.1.2 Surface area ✓

8.1.3 Reaction rate (or rate at which gas, $H_2$ is produced) ✓

8.1.4 Temperature and concentration ✓✓

8.2.1 A, Because a larger volume of gas if formed in a shorter time. ✓✓✓

8.2.2 $2HCl\ (aq) + Zn\ (s) \rightarrow ZnCl_2\ (aq) + H_2\ (g)$

$n_{H2} = V / V_o = 0.24 / 24 = 0.01$ ✓✓✓

$n_{Zn} = m / M$ , therefore: $0.01 = m / 65$ and thus: $m = 0.65g$ ✓✓✓

**QUESTION 9**

9.1.1 $1/R_p = 1/R_1 + 1/R_2 + 1/R_3$ ✓

$= 1/2 + ¼ + 1/12$✓

$= 10/12$✓

$R_p = 12/10 = 1,2\ \Omega$✓

9.1.2 $T_{tot} = 2 + 1,2 = 3,2\ \Omega$✓

$\varepsilon = I\ (R + r)$ ✓

$6 = I\ (3,2 + 0,8)$ ✓

$I = 1,5A$✓

9.2.1 The light will not shine. ✓The closed switch short circuits the current, no current through the bulb✓

9.2.2 Ammeter reading doubles. ✓Initially $R + r = 4\Omega$, but with closed switch $R + r = 2\Omega$. ✓

Thus $I = 6/2 = 3A$✓

9.3.1 The maximum✓ amount of **energy per charge**✓ that a battery can deliver to the whole circuit.

9.3.2 The pd between two points in a circuit is directly proportional to the current strength between the points at constant temperature. ✓✓

9.3.3 1 ampere of current flows when 1 C of charge passes a point in a circuit in 1 second✓✓

9.3.4 the opposition to the flow of charge. ✓

**TOTAL: 150 MARKS**