

Name of the Student: _____

Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

Q1.

- (a) (mixture of) compounds/substances with similar boiling points

*Allow similar number of carbon atoms / chain length / M_r / size**Ignore same boiling point / number of C atoms / chain length / M_r / size**Ignore reference to similar melting points**Ignore reference to similar chemical properties*

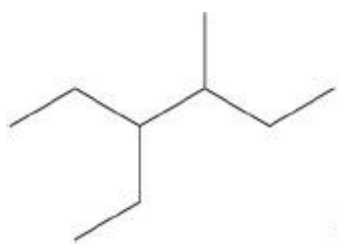
1

- (b) zeolites / aluminosilicates

Ignore aluminium oxide

1

- (c)



1

*Must be skeletal formula**Ignore working, including other forms of structure of this compound.*

1

- (d)
- M1**
- C_9H_{20}

M2 $C_9H_{20} + 14 O_2 \rightarrow 9 CO_2 + 10 H_2O$ *For **M2** allow ECF from their molecular formula, providing it is an attempt at the molecular formula of a hydrocarbon**Penalise **M1** only for not using molecular formula**Allow multiples and fractions*

2

- (e) (C=O) bonds vibrate (at IR frequency) / (IR/it makes) bonds vibrate
- or**

net change in dipole moment of molecule during (asymmetric) vibration **or**

(C=O) bonds are polar

Do not allow that CO_2 is a polar molecule / has a dipole

1

- (f)
- M1**
- acid rain / respiratory problems

M1 Allow direct consequences of acid rain; allow smog; allow production of ground level ozone

M2 catalytic converters

M2 allow description of process that occurs in catalytic converter but must include reference to a (named) catalyst

2

(g) no net emissions of carbon dioxide/CO₂ to the atmosphere

Allow explanation showing that same amount of CO₂ taken in and released to the atmosphere

Answer needs to refer to carbon dioxide (not just carbon)

1

[9]

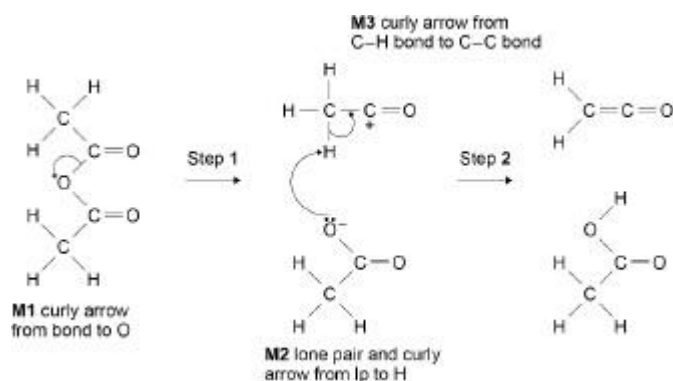
Q2.



Allow $C_nH_{2n}CO$ or $(CH_2)_nCO$ or $C_nH_{2(n-1)}O$

1

(b)



Allow other C-O bond breaking for M1

3

(c) M1 $\frac{k}{A} = e^{-E_a/RT}$

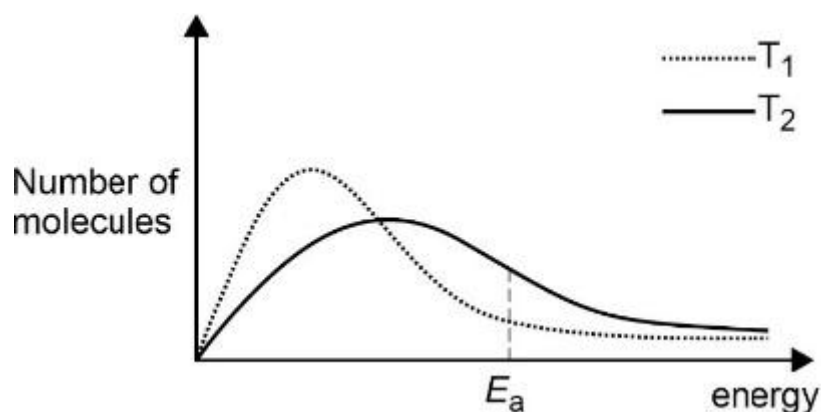
M2 $8.302 = \frac{34500}{8.31 \times T}$

M3 $T = 500 \text{ K}$

OR via $\ln k = \ln A - \frac{E_a}{RT}$ or shown with numbers

3

(d)



M5 At T_2 (many) more particles have $E \geq E_a$

M1 x axis labelled correctly (kinetic not required)

AND y axis labelled correctly allow particles

M2 E_a labelled on x axis

M3 Distribution correct shape for T_1

M4 Peak at T_2 lower with max shifted right and only crosses once

5

[12]