

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

- (a) Idea that it is hard to judge to the nearest 0.01 second or Idea that it is hard to judge the exact moment (that it becomes too cloudy / the cross disappears) or the idea of reaction time

Ignore ideas relating to accuracy (unless qualified)

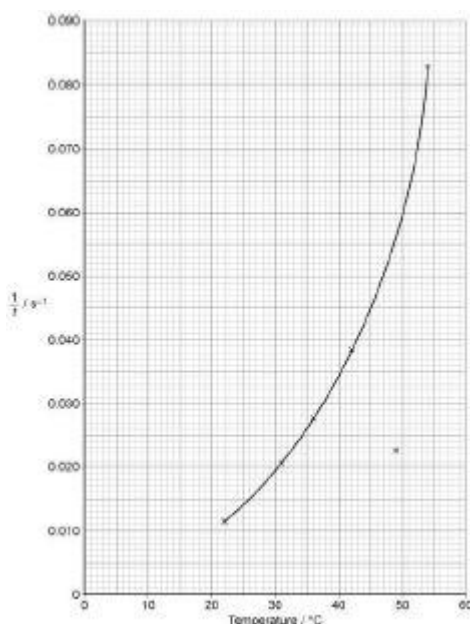
1

- (b) 0.083(3....)

1

- (c) **M1** points plotted correctly (allow $\pm 1/2$ small square for each)

M2 suitable best fit curve that misses point at 49°C and passes within one small square of the other five points



If any points plotted incorrectly: best fit line based on their plotted points which may need to be more than one square away from some points

*If no value calculated in (b), then **M1** and **M2** based on the other points (except the fifth anomalous point). A straight line may be allowed for **M2** for the first four points.*

*If incorrect value calculated in (b): **M1** based on all values being plotted correctly; **M2** based on suitable best fit line for the plotted points (except the fifth anomalous point).*

*Penalise **M2** if best fit line goes to 0,0.*

2

(d)

$\frac{1}{\text{value from their best fit line at } 40^{\circ}\text{C}}$

eg $\frac{1}{0.0345} = 29 \text{ (s)}$

Ignore units

1

- (e) as it forms a toxic gas or
SO₂ is toxic/poisonous or
to limit amount of SO₂ formed

Ignore reference to SO₂ being harmful

Ignore reference to acid rain / pollutant

1

- (f) reaction would take too long / too slow / take a long time / very slow

Ignore reaction may not occur

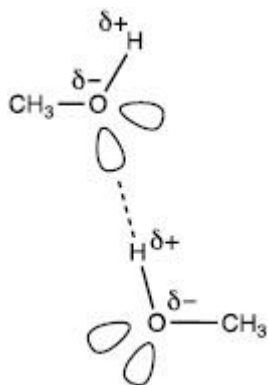
*Allow idea that it makes judging the moment when the cross
disappears more difficult*

1

[7]

Q2.

(a)



M1 on at least one O atom two lone pairs and
on at least one OH δ^+ on H and δ^- on O

1

M2 dotted line shown between lone pair on one molecule and the
correct H on another

1

M3 O $\cdots$ H–O in straight line

1

Accept pair of dots or crosses for lone pair in place of orbital shape (orbital shape may or may not include two electrons)

Ignore any partial charges on C–H or C–O bonds

*For straight line in **M3**, allow a deviation of up to 15°*

If a different molecule containing hydrogen bonding due to O–H bond drawn (e.g. ethanol, water) or an incorrect attempt at the structure of methanol, then maximum of 2 marks (i.e. only penalise if would score all three marks otherwise)

(b) Idea that lone pairs have greater repulsion than bonding pairs

There must be a comparison between the repulsion of a lone pair and bonding pair

Allow covalent bond = bonding pair

1

(c)

This question is marked using levels of response. Refer to the Mark Scheme Instructions for Examiners for guidance on how to mark this question.	
Level 3 5-6 marks	All stages are covered and the explanation of each stage is generally correct and virtually complete. (6 v 5) Answer is well structured, with no repetition or irrelevant points, and covers all aspects of the question. Accurate and clear expression of ideas with no errors in use of technical terms.
Level 2 3-4 marks	All stages are covered but stage(s) may be incomplete or may contain inaccuracies OR two stages are covered and are generally correct and virtually complete

	(4 v 3) Answer has some structure and covers most aspects of the question. Ideas are expressed with reasonable clarity with, perhaps, some repetition or some irrelevant points. If any, only minor errors in use of technical terms.
Level 1 1-2 marks	Two stages are covered but stage(s) may be incomplete or may contain inaccuracies OR only one stage is covered but is generally correct and virtually complete (2 v 1) Answer includes statements which are presented in a logical order and/or linked.
0 marks	Insufficient correct chemistry to gain a mark.

Stage 1

Describes the effect of catalyst use

1a use of a catalyst has no impact on equilibrium yield

1b use of a catalyst gives faster rate

1c use of catalyst lowers costs

Stage 2

Describes the effect of pressure

2a higher pressure gives a higher equilibrium yield

2b higher pressure gives a faster rate

2c the higher the pressure, the greater the cost

Stage 3

Describes the effect of temperature

3a lower temperature gives a higher equilibrium yield

3b higher temperature gives a faster rate

3c the higher the temperature, the greater the cost

Note that converse statements are fine (e.g. 1a higher temperature gives a lower equilibrium yield)