

- M1.(a) 36 cm³ 1
- (b) all points correct 2
± ½ small square
- allow 1 mark if 6 or 7 of the points are correct*
- 2 best fit lines drawn 2
must not deviate towards anomalous point
- allow 1 mark if 1 line correct*
- (c) The bung was not pushed in firmly enough. 1
- The measuring cylinder was not completely over the delivery tube. 1
- (d) as mass of lithium carbonate increases volume of gas produced increases 1
- linear / (directly) proportional 1
- (e) A gas / carbon dioxide is produced. 1
allow because the air in the tube expands
- (f) any **one** from:

- Potassium carbonate does not decompose to produce carbon dioxide / a gas.
- Potassium carbonate does not decompose at the temperature of the Bunsen burner **or** the Bunsen burner is not hot enough to decompose potassium carbonate.
- When potassium carbonate decomposes a gas is not formed.

1

[11]

- M2.(a) cotton wool 1
- (b) all points correct 2
± ½ small square
- allow 1 mark if 5 or 6 of the points are correct*
- best fit line 1
must not deviate towards anomalous point
- (c) (mass) 1
 2.1 (g)
allow ecf from drawn best fit line
- (time) 1
 100 (s)
- (d) a gas is produced 1
- which escapes from the flask 1
- (e) $\frac{9.85}{150} = 0.0656$ 1

0.07 (g / s)

allow ecf answer correctly calculated to 2 decimal places

1

(f) collect the gas in a gas syringe

1

measured the volume of gas

allow carbon dioxide for gas

1

allow for 1 mark

collected gas

or

counted bubbles

(g) The particles have more energy

1

The particles move faster

1

[14]

M3.(a) (i) oxygen, sulfur trioxide

both needed for mark

1

(ii) compound

1

(b) increases

accept (goes) higher / (goes) up / (is) faster / (are) more frequent

1

(c) activation

1

(d) catalyst **or** increase temperature

1

[5]

M4.(a) heat / energy

1

given out / transfers to surroundings

*the mark for given out / transfers to cannot be awarded without
heat / energy*

allow given off

1

(b) (i) decreases

1

increases

1

(ii) it gives the particles more energy

1

it makes the particles move faster

1

[6]

M5.(a) (i) In suntan creams 1

(ii) Much smaller 1

(b) (i) have a high surface area to volume ratio 1

(ii) because a catalyst provides an alternative / different pathway / mechanism / reaction route
accept adsorption or 'increases concentration at the surface'
ignore absorption 1

(that has) lower activation energy
allow weakens bonds
allow idea of increased successful collisions
max 1 mark for incorrect chemistry eg increased energy of particles 1

[5]

M6.	(a)	(i)	10	1
		(ii)	OH ⁻	1
	(b)	(i)	air	1
		(ii)	particles move faster	1
			particles collide more often	1
		(iii)	catalyst(s)	1
	(c)		liquid	1

[7]