

# RATE OF REACTION 2

## MARK SCHEME

### Q1.

| Question    | Answer                               | Extra information   | Marks |
|-------------|--------------------------------------|---|-------|
| (a)         | oxygen and water                     | both needed for mark<br>allow hydrogen oxide for water<br>in any order<br>ignore formulae | 1     |
| (b)(i)      | best fit line, omitting point at 10s | straight line drawn through all correct points  | 1     |
| (ii)        | circle around point at 10s           | allow any indication  | 1     |
| (iii)       | 7.5                                  | allow ecf from candidate's line   | 1     |
| (iv)        | increases (with time)                | accept goes from 0 to 12.5  | 1     |
| (c)(i)      | higher                               |   | 1     |
| (ii)        | more concentrated                    |   | 1     |
| Total marks |                                      |   | 7     |

### Q2.

| Question | Answer   | Extra information  | Marks       |
|----------|--|--|-------------|
| (a)      | the glow stick is brighter   | accept glow stick is less bright at <b>low temperatures</b><br>ignore references to rate / particles                 | 1           |
| (b)      | gave out light for less time   | accept use of figures from table for comparison<br>allow reference to speed / rate<br>e.g. quicker / faster reaction | 1           |
| (c)      | the particles will collide more often<br>the particles will move faster<br>the particles will have more energy |  | 1<br>1<br>1 |
| (d)      | any one from:<br>• repeat<br>• measure brightness eg use light meter<br>• more temperatures or wider           | allow more glow sticks   | 1           |

|             |                              |  |   |
|-------------|------------------------------|--|---|
|             | range<br>• improve precision |  |   |
| Total marks |                              |  | 6 |

**Q3.**

| Question    | Answer   | Extra information   | Marks  |
|-------------|--|---|--------|
| (a)(i)      | curve missing anomalous point  |   | 1      |
| (ii)        | answer in the range of 100.35 to 100.5   |   | 1      |
| (iii)       | reaction goes quickly at first<br>reaction stops   | accept reaction slows down  | 1<br>1 |
| (b)         | because carbon dioxide is produced<br>carbon dioxide / gas escapes,<br>therefore the mass of the flask<br>and contents decreases   | accept gas is produced  | 1<br>1 |
| (c)(i)      | the (marble) powder has a<br>larger surface area than the<br>(marble) chips<br>therefore, there can be more<br>collisions with the acid<br>particles (within the same<br>amount of time) |   | 1<br>1 |
| (ii)        | has a greater surface area<br>so, the reaction is faster   | accept so more frequent<br>collisions                                   | 1<br>1 |
| (d)         | the (minimum) amount of<br>energy (particles must have)<br>to react or to start a reaction   | accept the energy needed to<br>break bonds<br>ignore references to heat | 1      |
| Total marks |  |   | 11     |