Answers to Further Questions
in GCSE Chemistry for You (5th Edition)

On the following pages we show the Answers and Mark Schemes for the Further Questions on Practical Work.

The answers have been prepared by an Examiner using the mark schemes published by each Examination Board.

For the Student:

- It is very important that you are able to answer the questions on your own, using your own knowledge of Chemistry.
  So it is important that you have a go at the questions first, and then afterwards you can check your answers using these pages.
  If you get a question wrong, try to work out where you have made an error. Discuss it with your teacher if you are not sure.

- Be aware that in some answers the mark is for the idea in your own words (not necessarily the exact words shown), whereas in other answers the number and unit must be exactly correct.

For the Teacher:

- You will find these sheets useful when marking the students’ homework, or when going over the Further Questions in class.
  The Answer Sheet will also enable you to assess how much work is involved in answering the questions when planning how much homework to set.

- The PDFs are available for you to hand out to the students if you wish (perhaps as part of a Revision Programme).
  As with all mark schemes there may be alternative credit-worthy statements for qualitative answers (for the idea) and this may need to be explained to your students. Quantitative answers, however, are generally more prescriptive and your students may need to be encouraged to show the exact numerical value and the appropriate unit.

Lawrie Ryan
Practical Work

1 (a) 1 mark each for any two of Q, S and T.
(b) 1 mark each for P and R.
Total 4 marks

2 (a) (i) 2 marks for all points plotted correctly (allow 1 mark for one error);
1 mark for a best fit smooth curve through all of the points except the anomaly.
(ii) 1 mark for a circle round the point at (46,65).
(iii) 1 mark for a suggestion that would make the time too long, such as heating the acid to too low a temperature or leaving it too long before putting the flask on the balance so the acid cools.
(b) (i) 1 mark for reading the time at 30 °C from their graph (about 77 s);
1 mark for reading the time at 52 °C from their graph (about 45 s).
(ii) 1 mark for calculating the mean rate at 30 °C using their result in (b) (i) - about 0.013 g/s;
1 mark for calculating the mean rate at 52 °C using their result in (b) (i) - about 0.022 g/s.
(iii) 1 mark for the rate increases as temperature increases.
(iv) 1 mark for the idea that increasing temperature speeds up the movement of the particles;
1 mark for the idea that the frequency of collisions increases (there must be some idea of time scale, not just number of collisions or chance of collision);
1 mark for the idea that more of the collisions are successful or more of the particles have the activation energy.
(c) 1 mark for the idea that less energy would be transferred to the surroundings;
1 mark for the idea that the temperature stays more constant so is the temperature that was measured.
(d) 1 mark for the idea of cooling the flask by a sensible method such as standing it in an ice bath or cooling it in a fridge.
Total 16 marks

3 (a) (i) 2 marks for the idea that the time is proportional to the volume
OR 1 mark for the simpler idea of positive correlation or as volume increases time increases.
(ii) 1 mark for the idea that a larger volume contains more oxygen so the candle can burn for longer;
1 mark for the idea that twice the volume would contain twice as much oxygen so it would burn for twice as long.

4 (a) 3 marks for all 12 readings correct
2 marks for 10–11 correct
1 mark for 8–9 correct

<table>
<thead>
<tr>
<th>Volume of oxygen/cm³</th>
<th>Using catalyst W</th>
<th>Using catalyst X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>16</td>
<td>29</td>
</tr>
<tr>
<td>40</td>
<td>32</td>
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<td>60</td>
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<td>37</td>
</tr>
<tr>
<td>100</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

(b) 1 mark for sensible scales, correctly labelled and the correct way round;
1 mark for all points plotted correctly for W;
1 mark for line of best fit (smooth curve) for W;
1 mark for all points plotted correctly for X;
1 mark for line of best fit (smooth curve) for X;
1 mark for labelling both curves.
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(c) 1 mark for X;
   1 mark for the idea that X has the steeper gradient/slope so the reaction is faster.
(d) 1 mark for the idea that the same volume and concentration of hydrogen peroxide was used.
(e) 1 mark for the initial gradient being steeper than that of the other two curves;
   1 mark for the final volume being 37 cm$^3$.
   **Total 14 marks**

5 1 mark for the idea of measuring the temperature of the water;
   1 mark for measuring the mass of the burner before lighting it;
   1 mark for putting out the flame after a certain temperature rise (e.g. 20 °C);
   1 mark for measuring the mass of the burner and calculating the mass lost;
   1 mark for repeating with the other fuel and the same volume of water;
   1 mark for calculating the temperature rise per gram OR the idea that the one which used less mass of fuel transfers more energy to the surroundings.
   **Total 6 marks**