

MARK SCHEMES – Chemistry Unit 5 homework

Q1 calculates sum of all bonds broken:

$$4 \times (\text{C-H}) + 2 \times (\text{O=O}) = (4 \times 412) + (2 \times 496) = 2640$$

1

calculates sum of all bonds made:

$$4 \times (\text{O-H}) + 2(\text{C=O}) = (4 \times 463) + (2 \times 803) = 3458$$

1

overall energy change =

bonds broken – bonds made =

$$2640 - 3458 = (-)818$$

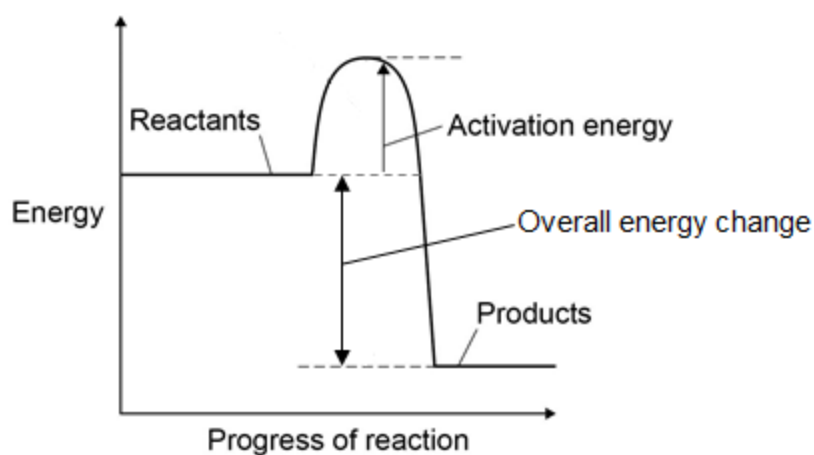
1

Q2 (a) the relative energies of the reactants, products and the overall energy change

1

the activation energy

1



Q3 (a) potato

1

effective, but manageable and safe

allow 1 for manganese dioxide is effective

1

(b) 75 cm³

1

(c) headings: time, volume

1

units: s or seconds, cm³

1

correct values for times, including 0

1

correct values for volumes

Time in seconds	Volume in cm ³
0	0
20	23
40	42
60	59
80	72
100	80
120	88

1

(d) any **one** from:

- gas escaped
- leak
- slow to put on bung
- systematic error

1

(e) any **two** from:

- concentration of peroxide
- volume of peroxide
- temperature
- mass of catalyst
- surface area of catalyst

2

[10]

Q4 Level 3 (5–6 marks):

A coherent method is described with relevant detail, which demonstrates a broad understanding of the relevant scientific techniques and procedures. The steps in the method are logically ordered with the dependent and control variables correctly identified. The method would lead to the production of valid results.

Level 2 (3–4 marks):

The bulk of a method is described with mostly relevant detail, which demonstrates a reasonable understanding of the relevant scientific techniques and procedures. The method may not be in a completely logical sequence and may be missing some detail.

Level 1 (1–2 marks):

Simple statements are made which demonstrate some understanding of some of the relevant scientific techniques and procedures. The response may lack a logical structure and would not lead to the production of valid results.

0 marks:

No relevant content

Indicative content

- remove bung and add magnesium
- start stopclock / timer
- measure volume of gas at fixed time intervals
- repeat with different concentrations of acid
- control volume of acid
- control initial temperature of acid
- control amount / mass / length / particle size of magnesium

6