

# C5 Quick Revision Questions

H = Higher tier only

SS = Separate science only

# Question 1 .... of 20

- Define an exothermic reaction

# Answer 1

.... of 20

- One that transfers energy to the surroundings so the temperature of the surroundings increases

# Question 2

.... of 20

- What is the energy needed to start a reaction?

# Answer 2

.... of 20

- Activation energy

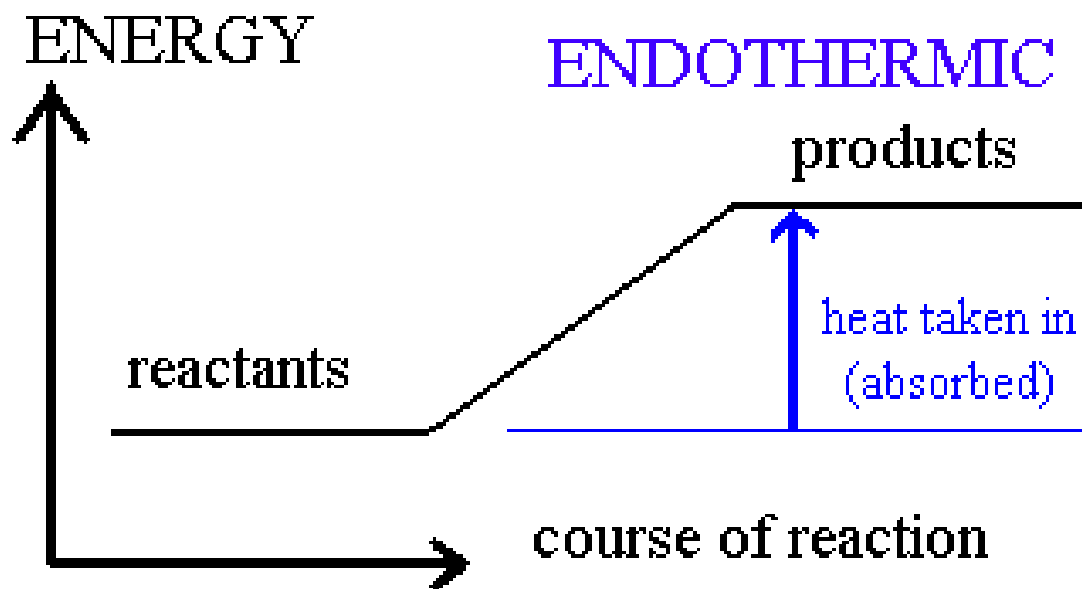
# Question 3

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- Sketch a reaction profile for an endothermic reaction

# Answer 3

.... of 20



# Question 4

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- What three things can reaction profiles show?



# Answer 4

.... of 20

- Relative energies of reactants and products
- Activation energy
- Overall energy change of a reaction

# Question 5

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- Explain in an exothermic reaction in terms of bond breaking and making

# Answer 5

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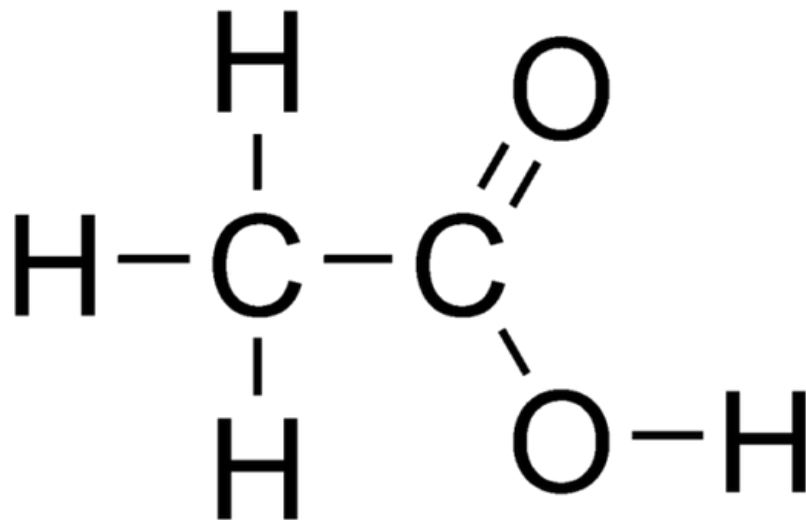
- Less energy is needed to break bond than released on making new bonds

# Question 6

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- What is the sum of the bond energies for 2 moles of the molecule below?

- C-H 412 kJ/mol
- C-C 368 kJ/mol
- C=O 532 kJ/mol
- C-O 352 kJ/mol
- H-O 465 kJ/mol



# Answer 6

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- $2 (3 \times \text{C-H}) = 2 (3 \times 412) = 2472$
  - $2 \times \text{C-C} = 2 \times 368 = 736$
  - $2 \times \text{C=O} = 2 \times 532 = 1064$
  - $2 \times \text{C-O} = 2 \times 352 = 704$
  - $2 \times \text{H-O} = 2 \times 465 = 930$
- $= 5906 \text{ kJ/mol}$

# Question 7

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- How does a cell between copper and zinc work?

- Copper is put into a solution of zinc ions
- Zinc metal will be deposited and copper metal will become copper ions in solution
- The difference in reactivity between the two metals will cause a change in voltage (seen through a voltmeter)

# Question 8

.... of 20 **SS**

- What do batteries consist of?



# Answer 8

.... of 20

- Two or more cells connected together in a series to provide a greater voltage

# Question 9

.... of 20 **SS**

- Why can rechargeable cells and batteries be recharged?

# Answer 9

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- The chemical reactions are reversed when an external electrical current is supplied

# Question 10

.... of 20 **SS**

- How is the voltage produced in terms of the relative reactivities of the two metals?

# Answer 10

.... of 20

- The more reactive metal forces the less reactive metal to accept electrons. Voltages are based on the 'relative' reactivity of metals

# Question 11

.... of 20 **SS**

A cell was set up with Ni electrodes in nickel(II) sulfate and silver electrodes in silver sulfate.

Write half equations for the reactions that occur at the electrodes

Ni forms  $\text{Ni}^{2+}$  ions and silver forms  $\text{Ag}^+$

# Answer 11

.... of 20

- $\text{Ag}^{2+} + \text{e}^{-} \rightarrow \text{Ag}^{+}$
- $\text{Ni}^{+} \rightarrow \text{Ni}^{2+} + \text{e}^{-}$

# Question 12

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- What is special about fuel cells?



# Answer 12

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- They don't need replacing or recharging like ordinary cells and batteries

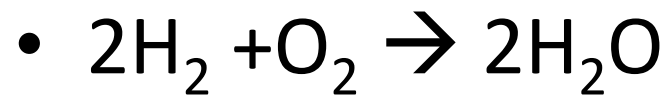
# Question 13

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- Write a balanced symbol equation for the reaction of hydrogen with oxygen

# Answer 13

.... of 20



# Question 14

.... of 20 **SS**

- Why do hydrogen and oxygen not explode in a fuel cell?

# Answer 14

.... of 20

- The energy released from the reaction is converted into electrical energy (very efficient process)

# Question 15

.... of 20 **SS**

- Give two advantages of fuel cells

- Direct energy transfer (chemical energy into electrical energy). Energy does not have to be converted into heat first
- Fewer transfer stages
- Less polluting, as water is the product
- Fuel cells last longer than conventional rechargeable batteries

# Question 16

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- What happens to the fuel in the fuel cell?



# Answer 16

.... of 20

- The fuel is oxidised electrochemically within the fuel cell to produce a potential difference

# Question 17

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- Why is the fuel cell reaction a redox reaction?

# Answer 17

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Electrons are gained and lost

# Question 18

.... of 20

- How would you go about measuring the amount of energy an alcohol gives as a fuel?

# Answer 18

.... of 20

- Allow the energy to transfer into a body of water whilst burning the alcohol in oxygen
- Measure the temperature increase of the water

# Question 19

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- What type of energy changes are:
  - Bond breaking
  - Bond making

# Answer 19

.... of 20

- Bond breaking = endothermic
- Bond making = exothermic

# Question 20

.... of 20

- Tom investigates temperature changes during a reaction with cold acid. How could he minimise heat losses?



# Answer 20

.... of 20

- Put a lid on the beaker
- Insulate the beaker/vessel