EXOTHERMIC REACTIONS,ENDOTHERMIC REACTIONS & BOND ENERGIES 4

MARK SCHEME

Q1.

Question	Answer	Extra information	Marks
	gives out energy or heat		1
Total marks			1

Q2.

Question	Answer	Extra information	Marks
(i)	the more sodium hydrogen carbonate the greater the temperature change up to 8 spatula measures then the temperature change is constant	accept examples from the table accept any correct indication of when change occurs if no marks awarded allow 1 mark for: the more sodium hydrogen carbonate the lower the final temperature	1 1 1
(ii)	energy is taken in from the surroundings or endothermic		1
Total marks			4

Q3.

Question	Answer	Extra information	Marks
(a)	the bag gets cold because heat energy is taken in from the surroundings		1
(b)	endothermic		1
(c)	any two from:		2

	• mix / spread (the ammonium nitrate and water) • dissolve faster • get cold faster or so the whole bag gets cold • particles collide more or more collisions	allow increase rate or quicker reaction	
Total marks			4

Q4.

Question	Answer	Extra information	Marks
(i)	the temperature of the solution will decrease		1
(ii)	energy is taken in from the surroundings		1
Total marks			2

Q5.

Question	Answer	Extra information	Marks
(a)	any **one** from: • solution becomes colourless or colour fades • zinc becomes bronze / copper coloured • zinc gets smaller • bubbles or fizzing	 allow copper (forms) or a solid (forms) allow zinc dissolves ignore precipitate	1
(b)	improvement: use a plastic / polystyrene cup or add a lid reason - must be linked reduce / stop heat loss OR improvement: use a digital thermometer reason - must be linked more accurate or easy to read or stores data	 accept use lagging/insulation allow use a data logger allow more precise or more sensitive ignore more reliable ignore improvements to method, eg take more readings	1 1

(c)	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response.		6
0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**
No relevant content.	There is a statement about the results.	There are statements about the results. These statements may be linked or may include data.	There are statements about the results with at least one link and an attempt at an explanation.

Examples of chemistry points made in the response:

Description:

Statements

Concentration of copper sulfate increases

Temperature change increases

There is an anomalous result

The temperature change levels off

Reaction is exothermic

Linked Statements

Temperature change increases as concentration of copper sulfate increases

The temperature change increases, and then remains constant

After experiment 7 the temperature change remains constant

Statements including data

The trend changes at experiment 7

Experiment 3 is anomalous

Attempted Explanation:

Temperature change increases because rate increases

Temperature change levels off because the reaction is complete

Explanation:

As more copper sulfate reacts, more heat energy is given off

Once copper sulfate is in excess, no further heat energy produced

Total marks			9