

# MARK SCHEME

# GCSE

## CHEMISTRY

## AQA - COMBINED SCIENCE

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C5 - TEST 1

ENERGY CHANGES

Beginner

## Mark schemes

1.	(a)	sodium hydrogen phosphorus oxygen		
		<i>2 marks for all 4 1 mark for 2 or 3 0 marks for 0 or 1 not symbols / formulae</i>		2
	(b)	(i)	gives out	
			<i>gets hot(ter) / temperature rises (1)</i>	1
			heat / energy	
			<i>independent mark</i>	1
		(ii)	<b>Quality of written communication</b>	
			<i>for clearly expressed ideas</i>	1
			take temperature of water at start	
			<i>owtte</i>	1
			take temperature after adding soup powder	1
			plus any <b>one</b> from:	
			• using a thermometer	
			• mix / stir / shake etc	
			• in beaker / conical flask / test tube / plastic cup	
			• temperature will rise (indicates an exothermic reaction)	1
				[8]
2.	(a)	electricity / (high) temperatures		
		<i>allow lightning / heat ignore energy</i>		1
	(b)	nitrogen + oxygen → nitrogen oxide/ monoxide		
		<i>allow any oxide of nitrogen</i>		1
	(c)	more than		1

- (d) (i) A 1
- (ii) C 1

[5]

3.

- (a) (i) 11 1
- (ii) 4620 (J)

*correct answer gains 2 marks with or without working*  
*allow 4.62kJ for 2 marks*  
*if answer is incorrect:*  
*100 × 4.2 × 11 gains 1 mark*  
**or**  
*100 × 4.2 × (their temp. rise) gains 1 mark*  
**or**  
*100 × 4.2 × (their temp. rise) correctly calculated gains 2 marks*

2

- (b) the temperature increases  
*allow gets hotter*  
*allow heat / energy is given off* 1

- (c) (i) (energy of) products lower than (energy of) reactants  
*allow converse*  
*allow arrow C points downwards* 1

- (ii) A 1

[6]

4.

- (a) Z 1

- (b) magnesium sulfate does not react with any of the metals  
*allow there is no change / increase in temperature with any of the metals* 1

- (c) temperature increase 1

- (d) **Level 2 (3–4 marks):**  
A detailed and coherent plan covering all the steps. The steps include the improvements and are set out in a logical manner.

**Level 1 (1–2 marks):**

Simple statements of improvements to the apparatus or steps are made but they may not be set out in a logical manner.

**0 marks:**

No relevant content

**Indicative content**

Simple statements

- stir the solution
- use the same amount of each solution
- use the same concentration of solution
- put insulation or a lid on the beaker
- measure how high temperature goes

Coherent statements in a logical order

- pour a fixed, measured volume of the metal salt solution into a plastic / polystyrene cup
- measure and record the temperature of the solution
- stir and add 1 g of metal to the solution
- (put a lid on the cup)
- measure and record the temperature after a set time or measure and record the greatest / highest temperature
- calculate and record the temperature increase
- (repeat each individual experiment at least two more times and calculate the mean temperature increase)

4

- (e) Activation energy

1

- (f)  $386 \text{ (kJ)} / 1370 \times 100$

1

28 %

1

**[10]**