

**UNIT 7: (Double Award) PRACTICAL ASSESSMENT
INVESTIGATING THE REACTION BETWEEN ZINC AND COPPER SULFATE SOLUTION**

MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

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cao = correct answer only
ecf = error carried forward
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SECTION A

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
1	(a)		<p>Copper sulfate risk: copper sulfate could get onto skin when being added to cup and</p> <p>Copper sulfate control measure: wash hands immediately if any copper sulfate gets on to them/ wear laboratory gloves</p> <p>OR</p> <p>Copper sulfate risk: copper sulfate could get transferred from hands to eyes and</p> <p>Copper sulfate control measure: wear eye protection (1)</p>	1			1		1
	(b)		<p>All data recorded and logically organised (1)</p> <p>Headings – number of spatulas/ temperature/ temperature increase (1)</p> <p>Units – °C (1)</p> <p>Temperature rise calculated correctly (1)</p> <p>Temperature rise means calculated correctly (1)</p>	1					
				1	1				
					1		5	2	5
			Section A total	4	2	0	6	2	6

SECTION B

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)	Independent variable - Number of spatulas (1) Dependent variable - Temperature rise (1)	2			2		2
		(ii)	Any 2 x (1) from: <ul style="list-style-type: none"> • Zinc + 1 microspatula • Copper sulfate volume + 50 cm³ • Copper sulfate concentration + 0.5 M 	2			2		2
	(b)		Axes labelled correctly with units (1) Scales & use of at least ½ of graph paper (1) All plots correctly plotted with ± ½ small square tolerance (2) 1 error (1) >1 error (0) Smooth curve of best fit within ± ½ small square division of all points (1) Don't accept thick, double, wispy line	1 1	2		5	5	5
	(c)		As more zinc is added there is an increase in temperature (1) To a given value (corresponding to graph) (1)		2		2		2
	(d)		To reduce heat losses to the surroundings		1		1		1
	(e)	(i)	Put a lid on the polystyrene cup/increase the insulation (1) Stirring (1)			2	2		2
		(ii)	Any 2 suitable inaccuracies (1) + improvement (1) masses of zinc on spatula vary (1) weigh out equal amounts of the zinc (1) OR thermometer only accurate to nearest °C(1) thermometer/ digital thermometer with higher resolution/ smaller divisions (1) OR measuring cylinder only accurate to nearest cm ³ (1) measuring cylinder with higher resolution/ smaller divisions (1)			4	4		4
	(f)		Exothermic	1			1		1

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(g)			Energy is needed to break bonds and energy is released when bonds are made (1) In this reaction more energy is released when bonds are made than is needed to break bonds (1)		2		2		2
	(h)			Correct calculation of ΔT (1) Correct substitution of figures (1) Correct calculation of E (1)	1	1		3	3	3
				Section B total	8	10	6	24	8	24

**UNIT 7: PRACTICAL ASSESSMENT
INVESTIGATING THE EXTENSION OF A SPRING**

MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

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SECTION A

Question				Marking details	Marks Available						
					AO1	AO2	AO3	Total	Maths	Prac	
1	(a)			As mass increases extension increases	1			1			1
	(b)			All data recorded and logically organised (1) Headings - mass/ length/ extension(1) Units – g / mm / mm (1) Accept kg / m Extension calculated correctly (1) Extension means calculated correctly (1)	1 1 1	1 1		5	2		5
				Section A total	4	2	0	6	2		6

SECTION B

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)	Independent variable – mass (1) Dependent variable – extension (1)	2			2		2
		(ii)	Same spring (1) Different springs have different stiffness (1)	1	1		2		2
	(b)		Scales & use of at least $\frac{1}{2}$ of graph paper (1) All plots correctly plotted with $\pm \frac{1}{2}$ small square tolerance (2) 1 error (1) >1 error (0) Line of best fit within $\pm \frac{1}{2}$ small square division of all points (1) Don't accept thick, double, wispy lines Correct force used (1)	1 1	2 1		5	5	5
	(c)		Yes (no mark) Since straight line (1) through origin (1) ecf		2		2		2
	(d)		Matched values taken from graph (1) Substitution (1) Correct answer with consistent unit N/m or N/cm (1)	1	1 1		3	2	3
	(e)		Calculation of k ($2 \times$ their value) (1) Substitution (1) Calculation of correct force e.g. consistent units in substitution (1)	1 1	1		3	2	3
	(f)		Scatter about mean (1) Scatter around line of best fit (1) Comment on overlapping (1)			3	3		3
	(g)		Effect of parallax when taking readings(1) Use a pointer / use a set square (1)		1	1	2		2

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(h)			Doubling force does not double extension (1) So not directly proportional (1)			2	2		2
				Section B total	8	10	6	24	9	24

WJEC GCSE Science SAMs from 2016/EM
16/12/15

**UNIT 7: (Double Award) PRACTICAL ASSESSMENT
INVESTIGATING THE SUGAR CONTENT OF BISCUITS**

MARK SCHEME

GENERAL INSTRUCTIONS

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SECTION A

Question				Marking details	Marks Available						
					AO1	AO2	AO3	Total	Maths	Prac	
1	(a)			Benedict's risk: sensible risk e.g. chemical splashing into eyes, risk of spitting if heat tubes directly and Benedict's control measure: wear goggles, heat tubes indirectly/using a water bath (1) Boiling water risk: sensible risk e.g. can cause burns to skin/eyes when carrying the beaker/water bath and Boiling water control measure: wear goggles, avoid spillages, care when handling (1)	2				2		2
	(b)			Ordered layout into columns (1) Suitable column headings (1) Appropriate units (1) Correct calculation of mean scores from two repeat sets of results (1)	1 1	1 1			4	1	4
				Section A total	4	2	0		6	1	6

SECTION B

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)	The type of biscuit (1)	1			1		1
		(ii)	The time taken for the (Benedict's reagent) colour change (1)	1			1		1
	(iii)	Any 2 (x1) from: <ul style="list-style-type: none"> • Control variable - mass of biscuit • Explanation - used a balance to weigh to 2 • Control variable - volume of cold/tap water • Explanation - used a measuring cylinder/ syringe to measure to 5 cm³ • Control variable - volume of Benedict's reagent • Explanation - used a measuring cylinder/ syringe to measure to 5 cm³ 	2	2		4		4	
	(b)		Use 2 g of a food that does not contain sugar (1) Same volume of Benedict's reagent (1) Other reference to same conditions e.g. same volume of water, use of boiling water in the beaker (1)		3		3		3
	(c)		Axes labelled correctly with units (1) Scales & use of at least ½ of graph paper (1) All plots correctly plotted with ± ½ small square tolerance (2) 1 error (1) >1 error (0)	1 1	2		4	4	4

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(d)		<p>Correct statement regarding which biscuit contained the most <u>or</u> the least sugar- check against candidates own results (1) All biscuits mean results considered (1)</p> <p>The faster/quicker/less time taken for the Benedict's reagent to change colour, the higher/greater/more sugar content of the biscuit (1)</p>			3	3		3
	(e)		<p>Random error stated as difficulty in judging when the Benedict's reagent had (fully) changed colour (1) Sensible suggestion of how to reduce the error e.g. sensor to detect colour change/ using the same person to make the judgement/ having agreement between two group members in making the judgement/ colour standard to compare (1)</p>	2			2		2
	(f)		<p>There is a delay of more than one tenth of a second between seeing the Benedict's colour change and stopping the stopwatch/difficulty in pinpointing the exact time of the colour change</p>		1		1		1
	(g)	(i)	<p>398.6 s is correctly circled (1)</p> <p>Anomalous results are not clustered to/do not fit the pattern/are not within the range of the other results (1)</p>			2	2		2
		(ii)	<p>Angharad included the anomalous result in her mean for C, otherwise that result would have been the lowest</p>			1	1		1
		(iii)	<p>Repeat trial 3 for C/ repeat all biscuits more times to assess repeatability (1) Compare with other groups for reproducibility (1)</p>		2		2		2
			Section B total	8	10	6	24	4	24

