



AS PRACTICAL 1

Water of crystallisation (Grid)

	Mr of MgSO ₄ .xH ₂ O given by student's results	% experimental error	Is the result within maximum apparatus uncertainty?	CPAC Criteria												
				other	1	2a	2b	2c	2d	3a	3b	4a	4b	5a	5b	
Research	Suitable methods chosen which would give valid results															
	Methods sequenced clearly															
	Sufficient detail included, including quantities and concentrations															
	Identified correct variables for measurement and control															
Risk assessment	Magnesium sulfate identified as low hazard															
	Suitable control measures identified															
References	Methods researched comprehensively															
	References cited with enough detail															
Procedure	Followed instructions carefully and independently															
	Assessed risks during practical, taking appropriate safety measures															
Recording of results	Table has lines within and round the outside															
	Clear recording of masses															
	Starting mass of tube given															
	Mass of tube + sample before heating given															
	Mass of tube + final sample given															
	Units shown															
	Mass recorded to appropriate resolution															
Calculation	Mr of MgSO ₄ = 120.4															
	Moles of MgSO ₄ at end correctly calculated (mass / 120.4)															
	Mr of H ₂ O = 18.0															
	Moles of H ₂ O lost correctly calculated (mass / 18.0)															
	Ratio MgSO ₄ to H ₂ O found and given to 3 sf															
	n rounded to nearest integer															
	Mr of MgSO ₄ .nH ₂ O found as mass / moles of MgSO ₄															
Apparatus uncertainty	Mr of MgSO ₄ .nH ₂ O given to 1 dp															
	Calculated as 2 x 100 x (0.005 / lowest mass)															
	Explains why 0.1 g resolution inappropriate															
Experimental error	Explains why 0.001 g resolution not necessary															
	Correctly calculated = 100 x (ans - 246.4) / 246.4															
	Correct statement whether accurate or not															
Constant mass	Explanation as how decided if accurate or not															
	Principle understood															
Results	Principle well explained															
	Result within apparatus uncertainty															

	Good evidence	Working towards	Description
1			Correctly follows instructions to carry out the experimental techniques or procedures.
2a			Correctly uses appropriate instrumentation, apparatus and materials (including ICT) to carry out investigative activities, experimental techniques and procedures with minimal assistance or prompting.
2b			Carries out techniques or procedures methodically, in sequence and in combination, identifying practical issues and making adjustments when necessary.
2c			Identifies and controls significant quantitative variables where applicable, and plans approaches to take account of variables that cannot readily be controlled.
2d			Selects appropriate equipment and measurement strategies in order to ensure suitably accurate results.
3a			Identifies hazards and assesses risks associated with these hazards when carrying out experimental techniques and procedures in the lab or field.
3b			Uses appropriate safety equipment and approaches to minimise risks with minimal prompting.
4a			Makes accurate observations relevant to the experimental or investigative procedure.
4b			Obtains accurate, precise and sufficient data for experimental and investigative procedures and records this methodically using appropriate units and conventions.
5a			Uses appropriate software and/or tools to process data, carry out research and report findings.
5b			Sources of information are cited demonstrating that research has taken place, supporting planning and conclusions.