Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1	a		**Any pair of answers from:** Insulate (the block) ✓ To reduce heat loss/energy being lost to the surroundings/ **AW** ✓ **OR** Make sure the heater is fully in the block ✓ To reduce energy being lost to the surroundings ✓ **OR** Wait until the thermometer stops rising before measuring the final temperature ✓ To account for the fact that there is a delay in the heat from the heater conducting to the thermometer / to ensure that the maximum temperature is recorded / **AW** ✓	2 (AO 3.3b x 2)	**IGNORE** (put a) lid (on it) **ALLOW** examples of appropriate insulation **ALLOW** Immersion heater in the middle More even heat distribution **ALLOW** Oil etc. in the hole To improve conduction **ALLOW** Temperature probe/digital thermometer Better resolution **Examiner's Comments** Question 20 (a) was generally well answered by the more successful candidates. A common misunderstanding of the diagram was to assume it was of a beaker, and to suggest placing a lid on the apparatus. Candidates who had seen the experiment performed might be less prone to this type of error.
	b		Copper ✓ It has the lowest/smallest specific heat capacity ✓	2 (AO 2.1 x 2)	No marks if copper is not chosen **ALLOW** it's the best conductor **Examiner's Comments** Question 20 (b) was well answered by most candidates, identifying copper as the material and giving the explanation that it had the lowest specific heat capacity of those in the table.
	c		1kg of material ✓ (changes state) liquid to gas / gas to liquid ✓	2 (AO 1.1 x 2)	**ALLOW** liquid evaporating / gas condensing **Examiner's Comments** Many candidates were given 1 mark for writing about a change in state between liquid and gas, but few

					mentioned that 1 kg of material was changed.
			Total	**6**	
2			D	1 (AO 2.2)	
			Total	**1**	
3			**C**	1 (AO 1.1)	
			Total	**1**	
4			**C**	1 (AO 1.2)	
			Total	**1**	
5			**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 3 150 000 (J) award 3 marks** Temperature change = 95-20 = 75°C ✓ Change in thermal energy = 10 × 4200 × 75 ✓ (Change in thermal energy =) 3 150 000 (J) ✓	3 (AO2.2) (2 × AO2.1)	**ALLOW ECF** from their temperature change. **Examiner's Comments** This question was well answered. Most candidates correctly worked out the temperature change and gained the correct answer.
			Total	**3**	
6			D ✓	1 (AO1.1)	
			Total	**1**	
7			C ✓	1 (AO2.1)	
			Total	**1**	
8			C ✓	1 (AO1.1)	
			Total	**1**	