Question	Answer	Marks	AO Element	Notes	Guidance
1	1. 80 (°C) (1) 2. 170 (°C) (1) **3.** 26 (minutes) (1)	**3**			
2	C - Its length increases.	**1**			
3	(E)= Pt **OR** in any form words or symbols **OR** 9000 × 1.0 **OR** 9000 J seen (1) 35 – 16 **OR** 19 (°C) seen (1) (m) = E /($c\Delta$T) or in any form, words or symbols **OR** 9000 / (4200 × 19) (1) 0.11 kg (1)	**4**			
4	1st box **gas** (1) 2nd box **solid** (1)	**2**			
5	more sensitive (1) greater expansion / more liquid (from bulb) (1)	**2**			

Question	Answer	Marks	AO Element	Notes	Guidance
6(a)	(*E* =) mcΔθ **OR** 65 × 720 × 7 (1) 3.3×10^5 (J) (1) P = E / t in any form **OR** (t=) E / P **OR** $3.3 \times 10^6 / 1.5 \times 10^3$ (1) 220 s (1)	**4**			
6(b)	any **two** from: the heater warms walls / floor / ceiling / windows / furniture / objects thermal energy conducted through walls / floor / ceiling / windows (to exterior) thermal energy used to raise temperature of air entering room via draughts / openings	**2**			
7	melting below arrow on left (1) condensing / condensation below arrow on right (1)	**2**			
8	(Q =) mcΔθ (1) 150 × 4.2 × (80 – 56) (1) 15000 J (1)	**3**			
					[Total: 23]