Question number	Answer	Notes	Marks
12 (a)	substitution into given equation, efficiency = <u>useful output energy</u> (x 100%) total output energy; rearrangement; evaluation of total output energy; evaluation of wasted energy; e.g. 0.16 = 1800 / total output total output = 1800 / 0.16 total output = 11 250 (J) (wasted energy = 11250 - 1800 =) 9500 (J)	 11250 (J) seen -1 POT here i.e. subtracting 1800 (J) from candidate's total output energy or calculating 84% of total output energy ecf wrong total output energy allow 9450 (J)	4
(b)	any two from: MP1. wrap beaker in insulation; MP2. cover top of beaker; MP3. fully immerse boiling tube in water; MP4. shiny outer layer to the beaker; MP5. use a thinner (walled) boiling tube MP6. use a better conducting boiling tube	 allow use a plastic beaker or beaker with better insulating properties allow 'use a lid' allow use a smaller boiling tube i.e. use a metal boiling tube	2

Total for Question 12 = 6 marks