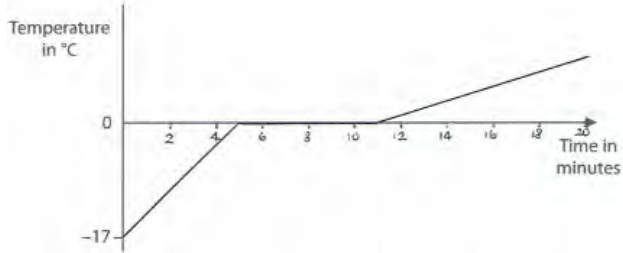


Question number	Answer	Notes	Marks
5 (a) (i)	<p>line starts at (0,-17) and rises to steady temperature of 0 °C (after 5 minutes); 6 minutes along time axis at temperature of 0 °C;</p> <p>line drawn showing increase in temperature from 0 °C until 20 minutes on time axis;</p> 	<p>allow candidate's time axis scale or clearly marked times line can be curved or straight</p> <p>ignore start and end times as long as duration is 6 minutes line can be curved or straight and can end at any temperature</p>	3
(ii)	<p>any one from:</p> <ul style="list-style-type: none"> • keep heater submerged; • (check) voltage remains constant; • idea of not removing lid; • stirring (once some ice has melted); • repeat and average; 	<p>ignore using more insulation, digital thermometer</p> <p>allow idea that lid is well sealed</p> <p>allow repeat and remove anomalies</p>	1
(b)	<p>dimensionally correct substitution into $\Delta Q = m \times c \times \Delta T$; rearrangement; evaluation;</p> <p>e.g. $2500 = 0.048 \times 880 \times \Delta T$ $\Delta T = 2500 / (0.048 \times 880)$ $(\Delta T =) 59 \text{ (}^\circ\text{C)}$ </p>	<p>allow mass in kg or g for this mark seen or implied from working -1 for POT error</p> <p>final answer of 42 = 2 marks</p> <p>allow 59.2, 59.18... (°C) condone 59.1 (°C)</p>	3

Total for Question 5 = 7 marks

Question number	Answer	Notes	Marks
7 (a)	opposite poles facing; held (very) close together;	reject if magnets described as touching	2
(b) (i)	arrow directed towards the centre of the circle in line with the position of the proton;	judge by eye condone arrow that does not originate at the position of the proton	1
(ii)	correct diameter given to 1 significant figure = 1 mark; correct diameter given to 2 or 3 significant figures = 2 marks;;	6 (cm) 5.8-6.1 (cm)	2
(iii)	use of radius; dimensionally correct substitution into $v = 2 \times \pi \times r / T$; evaluation; e.g. $r = (6.0 / 2 =) 3.0 \text{ cm}$ $v = 2 \times \pi \times 0.030 / 8.7 \times 10^{-6}$ ($v =$) 22 000 (m/s)	allow ecf from (b)(ii) -1 for POT error accept alternative method using $v = \pi \times d / T$ allow 21 000-22 000 (m/s)	3

Total for Question 7 = 8 marks