Question number	Answer	Notes	Marks
6 (a) (i)	Substitution (including conversion of time to seconds);		3
	Re-arrangement of given equation P = W/t;	Allow W or E for energy or work. Can be implied from their working.	
	Evaluation; e.g. Energy = 75 x (22 x 60) = 99 000 (J)	Accept 1650 or 5.9 million for 2 marks.	
(ii)	Any ONE assumption from • dog does not change temperature • dog does not change power output • rate of transfer is constant (despite increase in temp of water) • no heating of outside world/surroundings/material of bag • no heating from the surroundings	Ignore unqualified '100% efficient' or 'no energy lost'	1
(iii)	Use of Q = m x c x $\Delta\theta$;		4
	Substitution of their energy, mass, c;	Allow ECF from (a)(i)	
	Evaluation of temp change;	Allow ECF from evaluation of temp change.	
	Calculation of final temp = temp change + 16; e.g. 99 000 = 8.7 x 4200 x $\Delta\theta$ temp rise = 99 000/(8.7 x 4200) = 2.7 final temp = 19 (^{o}C);	Accept 16.04... for all marks (ecf E without min->s conversion) Accept answer to 3 or more sf i.e 18.7	

Question number	Answer	Notes	Marks
9 (a) (i)	Selection of P=F/A; Conversion of g to kg; Evaluation of weight; Evaluation of pressure; Correct answer: 140 (Pa) i.e. $W = 3.7 \times 10^{-3} \times 10 = 3.7 \times 10^{-2}$ N; $P = 3.7 \times 10^{-2} / (2.6 \times 10^{-4})$; P = 140 (Pa);	 0.0037 seen anywhere Accept any value that rounds to 140. i.e 142, 142.3, Accept use of 9.8(1) for 'g', giving 139(.46)	4
(ii)	Same weight (and larger cross-sectional area); P=F/A so smaller pressure;	Allow 'force' for weight	2
(b)	Increases continuously from -10 °C to 0 °C; Remains constant at 0 °C; Increases continuously from 0 °C to 20 °C;	Responses with no period of time at 0 °C score max 1 mark. Accept • Any gradient • Straight lines or curves for the increasing temperature parts • Any non-zero amount of time at 0 °C by eye Ignore any numbers on the time axis.	3
(c)	Any TWO from: Bonds between particles are weakened or broken; Particles go from regular to irregularly packed/EQ; Particles go from vibrating (about a fixed position) to sliding past each other/EQ;	 Allow particles get (slightly) further apart/EQ; ignore references to KE	2