Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Mark Schemes

Q1.

Question Number:	Answer	Additional Guidance	Mark
	substitution (1) (KE =) ½ x 68 x 12^2 evaluation (1) 4900 (J)	 ½ x 68000 x 12^2 scores 1 mark accept values that round to 4900(J) e.g. 4896(J) award full marks for correct answer without working	**(2)** AO 2 1

Q2.

Question number	Answer		Mark
(i)	An answer that combines the following points of understanding to provide a logical description: • when steam condenses, its molecules move closer together, so the internal energy decreases (1) • when the water from the condensed steam cools, its molecules move more slowly, therefore storing less kinetic energy (1)	allow as water cools, the distance between the particles decreases which increases the intermolecular forces	(2)

Question number	Answer	Additional guidance	Mark
(ii)	equating the variables in the three equations/principle of conservation of energy (1) $(m_w \times l_w) + (m_w \times c_w \times \Delta\theta_w) = (m_m \times c_m \times \Delta\theta_m)$ rearrangement (1) $m_m = \frac{(m_w \times l_w) + (m_w \times c_w \times \Delta\theta_w)}{(c_m \times \Delta\theta_m)}$ substitution of correctly calculated quantities (1) $= \left(\frac{\left(\left(\frac{25}{1000}\right) \times 2260000\right) + \left(\left(\frac{25}{1000}\right) \times 4200 \times 35\right)}{3840 \times 60} \right)$ evaluation (1) 0.26 (kg)	allow in words or with suitable alternative subscripts temperature changes and l_w must be correct allow maximum of 3 marks for calculations that omit the energy from cooling of water	(4)

Question number	Answer	Mark
(iii)	Any two of the following reasons: • more steam must condense and transfer the energy that is dissipated to the jug during the process (1) • more steam must condense and transfer the energy that is dissipated to the surroundings during the process (1) • more steam must condense and transfer the energy needed to cause the milk to froth (1) • more steam must condense to replace any steam that might leave the milk without condensing (1)	**(2)**

Q3.

Question number	Answer	Additional guidance	Mark
(i)	Recall GPE = m x g x Δh (1) Substitution = 400 x 9.8 x 1.5 (1) Evaluation = 5900 (J) (1) (which is nearly 6000 J)	 accept 5880 (J)	(3)

Question number	Answer	Additional guidance	Mark
(ii)	An explanation that combines identification – knowledge (1 mark) and reasoning (1 mark) • energy is dissipated/scattered (1) • into the surroundings (1)	 energy from a loss of ball's PE / its gain in KE ends up as (kinetic) energy of molecules (of ball / wall / air)	(2)

Question number	Answer	Mark
(iii)	**B** velocity	(1)

Q4.

Question number	Answer	Additional guidance	Mark
(i)	Recall GPE = m x g x Δh (1) Substitution = 400 x 9.8 x 1.5 (1) Evaluation = 5900 (J) (1) (which is nearly 6000 J)	 accept 5880 (J)	(3)

Question number	Answer	Additional guidance	Mark
(ii)	An explanation that combines identification – knowledge (1 mark) and reasoning (1 mark) • energy is dissipated/scattered (1) • into the surroundings (1)	 energy from a loss of ball's PE / its gain in KE ends up as (kinetic) energy of molecules (of ball / wall / air)	(2)

Question number	Answer	Mark
(iii)	B velocity	(1)