Name of the Student:_____

Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

Question Number:	Answer	Additional Guidance	Mark
	an explanation linking: over the **same time / in 300s**, more work done / energy transferred in session 1 than in session 2 (1) (therefore) more power (developed) in session 1 (1)	allow reverse argument power in session 1 = $\frac{45.2}{300}$ = 0.15 (kW) or 150(W) allow statement that power = work / time or power = energy(transferred) / time for MP1 power in session 2 = $\frac{37.9}{300}$ = 0.13 (kW) or 126(W)	**(2)** AO 3 2a AO 3 2b

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Q2.

Question Number:	Answer	Additional Guidance	Mark
	an explanation linking: over the **same time / in 300s**, more work done / energy transferred in session 1 than in session 2 (1) (therefore) more power (developed) in session 1 (1)	allow reverse argument power in session 1 = $\frac{45.2}{300}$ = 0.15 (kW) or 150(W) allow statement that power = $\frac{\text{work}}{\text{time}}$ / or power = $\frac{\text{energy(transferred)}}{\text{time}}$ for MP1 power in session 2 = $\frac{37.9}{300}$ = 0.13 (kW) or 126(W)	**(2)** AO 3 2a AO 3 2b

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Q3.

Question Number:	Answer	Additional Guidance	Mark
	recall and substitution (1) 1600 = force x 28 rearrangement (1) (force) = $\frac{1600}{28}$ evaluation (1) 57 (N)	substitution and rearrangement in either order accept f, F or ? for force accept values that round down to 57 e.g. 57.14 award full marks for correct answer without working award 1 mark for answers of 44800 or 0.0175 **and** a correct expression relating work, force and distance	**(3)** AO 2 1

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Q4.

Question Number:	Answer	Additional Guidance	Mark
	recall and substitution (1) 1600 = force x 28 rearrangement (1) (force) = $\frac{1600}{28}$ evaluation (1) 57 (N)	substitution and rearrangement in either order accept f, F or ? for force accept values that round down to 57 e.g. 57.14 award full marks for correct answer without working award 1 mark for answers of 44800 or 0.0175 **and** a correct expression relating work, force and distance	**(3)** AO 2 1

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Q5.

Question number	Answer	Additional guidance	Mark
i	rearrangement **and** substitution (1) $(\Delta\theta =) \frac{210\ (x10^3)}{5.8 \times 860}$ evaluation (1) 42 (°C)	$(\Delta\theta =) \frac{210\ (x10^3)}{4988}$ accept any value which rounds to 42 e.g. 42.10 award full marks for the correct answer without working 4.2 to any other power of 10 scores 1 mark	**(2) AO2.1**

Question number	Answer	Additional guidance	Mark
ii	an explanation linking any **two** from not **all** the energy supplied goes to the brick (1) not all the energy supplied stays in the brick (1) energy transferred to the storage heater parts (1)	ignore: • energy is lost / wasted, unqualified • not 100% efficient • arguments about sound energy accept heat for energy throughout less (thermal) energy given to brick energy transfers from the brick	**(2) AO2.1**

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	energy transferred to the surroundings (1) argument linking Δθ to ΔQ **using** $\Delta\theta = \frac{\Delta Q}{m \times c}$ (1)	energy dissipated from the equation, if energy supplied to the block is smaller the change of temperature will be smaller 'brick transfers (thermal) energy to the surroundings' scores 2 marks	

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Q6.

Question number	Answer	Additional guidance	Mark
(i)	rearrangement of work = force × distance to give distance = work ÷ force (1) substitution and evaluation (1) 18 (m)	 seeing 2700 ÷ 150 Award full marks for correct answer without working	**(2)**

Question number	Answer	Mark
(ii)	2700 (J)	**(1)**

Question number	Answer	Additional guidance	Mark
(iii)	rearrangement of $KE = ½ mv^2$ $v = \sqrt{(2 \times KE \div m)}$ (1) substitution and evaluation (1) 19 (m/s)	 $v = \sqrt{(2 \times 2700 \div 15)}$ $v^2 = (2 \times 2700 \div 15)$ allow answers that round to 19 award full marks for correct answer without working allow alternative route using $v^2 - u^2 = 2ax$ for full marks	**(2)**

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