

Question number	Answer	Notes	Marks
5 (a) (i)	substitution into $E = V \times I \times t$; rearrangement; correct evaluation to 2 s.f.; e.g. $25 = 4.5 \times 0.65 \times \text{time}$ (time \Rightarrow) $25 / (4.5 \times 0.65)$ (time \Rightarrow) 8.5 (s)	no mark for formula alone as given in paper correct answers not given to 2 s.f. gain 2 marks only e.g. 9 (s), 8.55 (s), 8.547... (s) etc.	3
(ii)	GPE = mass \times g \times height;	allow rearrangements and standard symbols e.g. GPE = $m \times g \times h$	1
(iii)	substitution; rearrangement; evaluation; e.g. $5.0 = 0.780 \times 10 \times \text{height}$ (height \Rightarrow) $5.0 / (0.780 \times 10)$ (height \Rightarrow) 0.64 (m)	answer of 0.000 64 (m) gains 2 marks only allow 0.641... (m) allow use of $g = 9.81$ giving 0.65 (m)	3
(iv)	any two from: MP1. energy transferred (to surroundings) as heat / sound; MP2. mass also has KE; MP3. mass of string has been ignored / eq.; MP4. motor not 100% efficient;	condone energy wasted as heat/sound energy lost to wires/winding in motor	2
(b)	any four from: MP1. current in <u>coil</u> ; MP2. (creates) magnetic field around wires / coil; MP3. interaction between this field and field of magnets; MP4. (produces) a force on the wires / coil; MP5. forces on opposite sides of the coil are in opposite directions;	check diagram for force arrows allow coil becoming electromagnet can be shown on the diagram	4

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10 (a)	<p>particles collide with walls (of can);</p> <p>idea that force is produced (by bombarding particles);</p> <p>pressure is force on an area;</p>	<p>allow bombard, hit, impact upon</p> <p>allow Newton's Laws / momentum argument</p> <p>allow $p = F / A$</p> <p>ignore ideas of particles closer to each other</p>	3
(b)	<p>MP1 pressure increases;</p> <p>any two from MP2 to MP4</p> <p>MP2. increase in {(average) speed / <u>kinetic energy</u>} of particles (due to higher temp);</p> <p>MP3. particles collide with wall more often;</p> <p>MP4. particles collide with wall with more force;</p>	<p>allow alternatives for particles e.g. molecules</p> <p>allow 'hit harder'</p> <p>allow greater change of momentum</p>	3
(c)	<p>substitution into $p_1V_1 = p_2V_2$;</p> <p>rearrangement;</p> <p>evaluation;</p> <p>e.g.</p> <p>$p_1 \times 8500 = 100 \times 43000$</p> <p>$(p_1 =) (100 \times 43000) / 8500$</p> <p>$(p_1 =) 510 \text{ (kPa)}$</p>	<p>no mark for equation as given in paper</p> <p>-1 for POT error</p> <p>allow 505.88...</p>	3

Total for question 10 = 9 marks