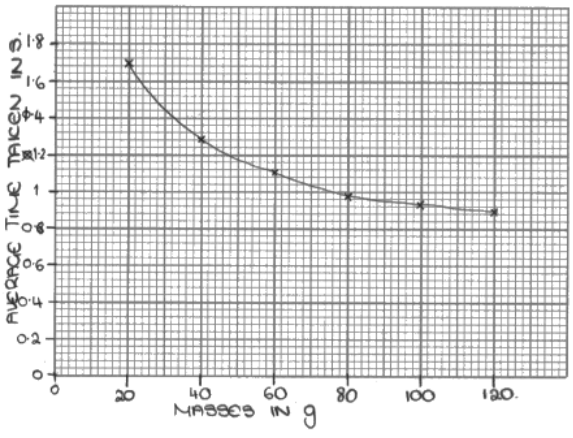
Question number	Answer	Notes	Marks
5 (a) (i)	substitution into E = V × I × t; rearrangement; correct evaluation to 2 s.f.; e.g. 25 = 4.5 x 0.65 x time (time =) 25 / (4.5 x 0.65) (time =) 8.5 (s)	no mark for formula alone as given in paper correct answers not given to 2 s.f. gain 2 marks only e.g. 9 (s), 8.55 (s), 8.547... (s) etc.	3
(ii)	GPE = mass × *g* × height;	allow rearrangements and standard symbols e.g. GPE = m × *g* × h	1
(iii)	substitution; rearrangement; evaluation; e.g. 5.0 = 0.780 x 10 x height (height =) 5.0 / (0.780 x 10) (height =) 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 coil; 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

	MP6. idea that direction of current reverses (every half turn);	allow commutator switches current around	

Total for question 5 = 13 marks

Question number	Answer	Notes	Marks
6 (a)	use of stopwatch / stop clock; start timing when released and stop timing when parachute hits the floor;	allow use of datalogger condone timer	2
(b)	independent = mass (of parachute); dependent = time (taken for fall);		2
(c)	any one from: (constant) height; still air / no wind; release from rest; same area of parachute / same parachute;	however expressed	1
(d) (i)	correct average; given to 2 decimal places; e.g. 0.87666... 0.88	 mark independently	2
(ii)	suitable linear scale chosen (>50% of grid used); axes labelled with quantities and unit; plotting correct to nearest half square (minus one for each plotting error) ;;  	ignore orientation **ignore final point** i.e. two plotting errors = no marks for plotting **mass in g** / **average time taken in s** 20 / 1.68 40 / 1.26 60 / 1.11 80 / 0.99 100 / 0.93 120 / 0.88	4