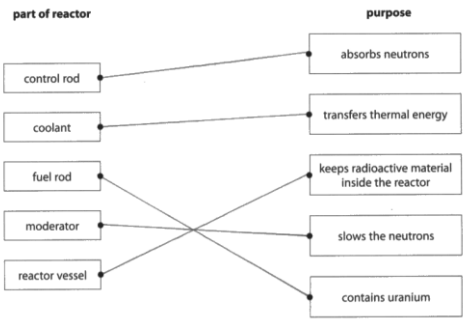
Question number		Answer	Notes	Marks
3 (a)	i	3.1 ONLY circled in the table;		1
	ii	(average) speed = distance (moved)/time (taken);	accept words or standard symbols	1
	iii	discards anomalous result; calculates mean time for B; substitution; evaluation; e.g. average time = 4.7 gets 1 marks average time = 5.5 gets 2 marks speed = 20/ 5.5 gets 3 marks =3.7 gets 4 marks	 allow 4.67 Allow 5.45 allow 20/5.45 Allow 3.67 answers which round to 4.3 get 3 marks	4
	iv	explanation including the following ideas EITHER bar chart; because woodpeckers are discrete / eq; OR mass is a continuous variable; therefore scatter-gram / eq;	 condone histogram DOP DOP allow line graph	2
b		discussion to include any 3 ideas from: MP1. there is no (discernible) pattern; MP2. supporting data quoted; MP3. discussion of why prediction is wrong/ C should be fastest; MP4. three data sets is insufficient to decide; MP5. need for further data to extend range of results;	no mark for unqualified 'yes' or 'no' results don't go in order/eq allow calculated speeds (cm/s) A= 1.8 B= 3.7 (4.3) C = 2.3 A heaviest,slowest; B middle, fastest; C lightest, middle ignore discussion of anomalies	3

Total 11 marks

Question number	Answer	Notes	Marks
7 (a)	any three of the following: MP1. current increases during first **0.04s**/ to maximum of **0.4A**; MP2. current increase is **linear** /proportionate to time; MP3. (then) current drops for next **0.44s** / by **0.48s**; MP4. current decrease is **nonlinear**; MP5. (final)current constant value is **0.2 A**/ from **0.48s** onwards;	 allow 'at first' for first 0.04s allow 0.5s allow 0.5s	3
b i	0.2 A;		1
ii	V= I R;	accept words or standard symbols	1
iii	substitution; rearrangement; evaluation; unit; e.g. 12 =0.2×R R= 12/0.2 =60 Ω	**accept ecf from bi** independent mark	4
iv	P= IV;	accept words or standard symbols	1
v	substitution; evaluation; e.g. P= 0.2 ×12 2.4 (W)	**accept ecf from bi**	2
c	filament heats up very rapidly (at the start); causing it to melt/ break;	allow wire for filament	2

Total 14 marks

Question number	Answer	Notes	Marks
12 (a)	5 correct lines score 4 marks;;;; 4 or 3 correct lines score 3 marks;;; 2 correct lines score 2 marks;; 1 correct line scores 1 mark;  		4
b	C neutrons;		1
c	any four from: MP1. neutron absorbed by; MP2. uranium(-235) **nucleus**; MP3. causing it to split; MP4. into 2 daughter **products /nuclei / isotopes**; MP5. releasing further neutrons /energy;	only accept precise terminology allow hits/collides/eq allow named products	4
d	any three comparisons from (however expressed): MP1. decay is random but fission is not; MP2. fission induced by input particle but decay occurs without an input particle; MP3. fission produces 2 daughter nuclei but decay produces only 1; MP4. α or β are emitted from decay but not from fission;		3