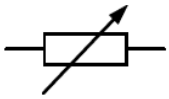
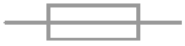
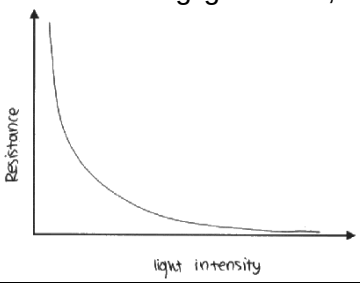
Question number	Answer	Notes	Marks
1 (a) (i)	C – Holmes; The only correct answer is C A is not correct because it's a planet B is not correct because it's a galaxy D is not correct because it's a moon		1
(ii)	B – Hoag's Object; The only correct answer is B A is not correct because it's a planet C is not correct because it's a comet D is not correct because it's a moon		1
(b)	B – Milky Way; The only correct answer is B A is not correct because it's a different galaxy C is not correct because it's a different galaxy D is not correct because it's a different galaxy		1

Total for question 1 = 3 marks

Question number	Answer	Notes	Marks
4 (a)	1 mark for each correct line;;;; Name of component / Circuit symbol fixed resistor  variable resistor  cell  lamp  fuse / circuit breaker 	symbols do not need to have connecting wires shown at each side arrow can be any direction but must be diagonal only ignore 'battery' allow filament lamp symbol 	4
(b) (i)	voltage = current x resistance;	allow in standard symbols or in words e.g. V = I x R	1
(ii)	substitution OR rearrangement; evaluation; e.g. R = V/I = 8.0/0.50 R = 16 (ohms)	either seen	2
(c)	axes labelled with resistance and {light intensity / light / intensity / brightness}; resistance decreasing as light intensity increases; curve of decreasing gradient; e.g. 	ignore units and orientation allow 'dark' and 'light' labels DOP DOP	3

Total for question 4 = 10 marks

Question number	Answer	Notes	Marks
11 (a)	MP1. ammeter connected in <u>series</u> with filament lamp; MP2. voltmeter connected in <u>parallel</u> with filament lamp; MP3. suitable method of varying the voltage (e.g. by using variable resistor or using variable power supply);	marks are for how components are connected so ignore circuit symbols throughout allow voltmeter connected in parallel with lamp and ammeter	3
(b)	any 4 of: MP1. read ammeter / voltmeter OR record current / voltage; MP2. current is measured for more than one voltage; MP3. repeat readings and calculate average (mean); MP4. plot graph; MP5. suitable experimental precaution, e.g. check meters for zero error / switch off current between readings;		4

Total for question 11 = 7 marks

(d)	(i)	slow down <u>neutrons</u>;	allow reduce (kinetic) energy of <u>neutrons</u>	1
	(ii)	any 2 of: graphite (ends) did not absorb neutrons; more (uranium nuclei underwent) fission; increased {rate of reaction / amount of energy produced / rate of fission};	allow more 'neutrons absorbed by (uranium) nuclei' allow 'caused a large chain reaction'	2

Total for question 13 = 11 marks