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Mark Scheme (Results)

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GCSE Physics
5PH2F/01

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Question Number	Answer	Acceptable answers	Mark
1(a)(i)	B to the left ←		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	A accelerating		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	substitution 625x 10 (1) Evaluation 6250 (N) (1)	625 x 9.8 6125 (N) give full marks for correct answer, no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	 (1) air resistance (1)	upward arrow on any part of line vertical line from any point on the diagram air friction, upthrust, drag Ignore any downward arrow labelled weight or gravity	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	Balanced (1) Zero (1)		**(2)**

Total for marks for question 1 = 8

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	A 92		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	neutron(s) (1)	allow phonetic spelling nutron, newtron, nuetron	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	An explanation linking any two of the following points • a neutron(s)(1) • hits nucleus/nuclei (1) • uranium/nucleus splits (1) • (producing) neutrons /daughter nuclei/ energy / Kr and Ba (1)	 collides/is absorbed breaks/divides accept chain reaction for 1 mark if no other mark awarded accept a correctly labelled diagram	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)	An explanation linking two of the following points • absorb (1) • neutrons (1) • (influences) chain reaction / rate of reaction (1)	Accept reverse arguments collects/removes/takes away slows down/changes	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(d)	An explanation linking any two of the following points • heats/boils water (1) • to produce steam (1) • to run/turn/spin turbines (1) • to turn/power generators (1)	 labelled diagram that indicates process (not just parts). heats boiler turns a coil in a magnet	**(2)**

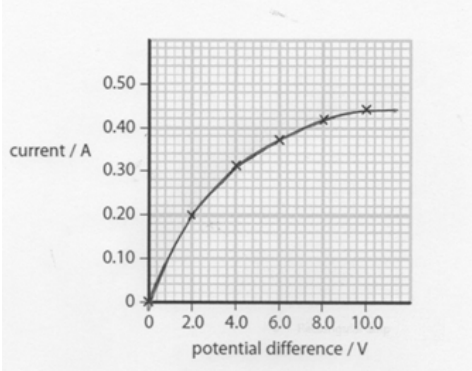
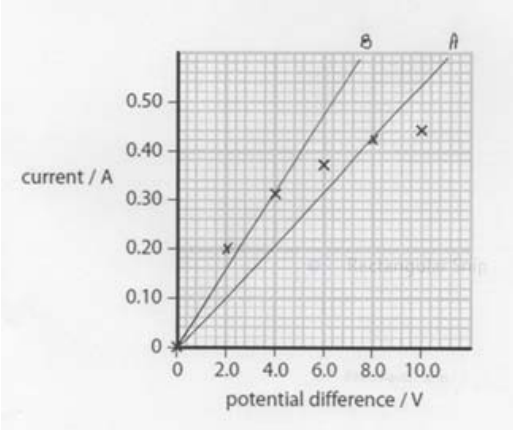
Total marks for question 2 = 8

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	D variable resistor		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	B in parallel with the lamp		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)(iii)	A description including • resistance changed (1) • reduced/decreased/lowered (1) **OR** • voltage/p.d /EMF (of supply) changed (1) • increased /turned up/higher(1)	 remove (variable) resistor /component X (2) number of batteries/number of cells add another cell/battery/battery pack/power pack/power supply (2)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	both points correct (1)	allow + / - half square	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	curve of best fit judged by eye (1)  	Must pass through zero and two other points. 5th point can be either (8.0,0.42) or (8.0, 0.44) straight line of best fit through origin tolerance between lines A and B shown on the diagram  5th point can be either (8.0,0.42) or (8.0, 0.44)	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(c)	substitution (1) 10/0.44 or 250/11 evaluation (1) 23 (ohms)	give full marks for correct answer, no working 22.7(ohms),22.73 (ohms), 22.72(ohms) Ignore excessive decimal places.	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(d)(i)	an explanation linking two of the following points • electric(al)(energy) (1) • (is converted) to heat / thermal (energy) (1) • (is converted) to light (1)	electricity	**(2)**

Total marks forquestion3 =10

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	B it decreases		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	C it does not change		**(1)**

Question Number	Answer	Acceptable answers	Mark
4 (b)(i)	horizontal arrow (judge by eye), pointing to the right **anywhere** on the diagram 		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	substitution: (1) 130 000 × 75 evaluation: (1) 9 750 000 (kgm/s) (Ns)	give full marks for correct answer, no working Ignore minus sign 9.75×10^6 (kgm/s) (Ns)	**(2)**

Question Number	Answer	Acceptable answers	Mark
4 (b)(iii)	9 750 000 kgm/s	same value as answer to (b)(ii) Ignore minus sign	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	An explanation linking two of the following: • force is smaller/less (1) • momentum changes more slowly (1) • lower deceleration (1) • use of the formula (1)	 pressure is smaller/less slower deceleration force is proportional to rate of change of momentum/F= (mv – mu)/t	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)(ii)	Any two from: (for loaded aircraft) • has more mass (1) • has more momentum (1) • has more k.e. (1) • higher velocity • brakes need to do more work (1)	accept reverse argument for empty aircraft heavier/more passengers/more cargo higher speed/moving faster	**(2) expert**

Total marks for question 4 = 10 marks

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	any one of X-ray (machines) / smoke alarms/ nuclear/ radioactive waste (1)	nuclear weapons (tests) nuclear power plants (medical) tracers/technetium	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	an explanation linking: comes from granite / rocks (1) none/ less of these (rocks) in some areas (1)	in some areas/Cornwall/Aberdeen the second mark is dependent on the first.	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	suitable lines on graph to show halving after about 200 000 years (2) • horizontal line at 750 +or –50 Bq on y-axis to curve (1) •meeting (by eye) vertical line from x-axis between 190,000 years and 230,000 years (1)	use of data from graph to show halving after about 200 000 years 1500/2 =750(Bq) or 1600/2=800(Bq) gives a half-life of 210,000 +or- 20 000 (years)	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	any one of • penetrates/passes through the skin (1) • ionises (1) • damages tissue/ cells/DNA (1) • mutates cells/DNA(1) • causes cancer(1)		**(1)**

Total marks for question 5 = 12

Question Number		Indicative Content	Mark
QWC	***5(c)**	an explanation which may include some of the following points: <u>properties of nuclear waste</u> radioactivity is dangerous some isotopes in nuclear waste have long half-lives/radioactive for thousands of years products of fission are warm identified radiation from nuclear waste e.g alpha, beta, gamma <u>problems caused by nuclear waste</u> leakage of radioactivity contamination of ground/sea water/lakes /rivers contamination of crops/fish/animals/drinking water harm to humans/cancer/radiation poisoning/ damage to cells/mutation of cells or DNA difficulty in transporting safely/ stolen by terrorists fears of local people <u>solutions for dealing with nuclear waste safely</u> long term storage, underground /under the sea radiation shielding, lead/steel/concrete/ containers, sealed in glass. human safety, radiation suits, using tongs/lead jackets safe location, away from people/remote areas/sea cooling, ponds information to persuade local people of safety	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation mentioning at least one point, but without linking, e.g. radioactivity is dangerous ; nuclear waste should be stored underground ; terrorists might steal nuclear waste; • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation mentioning two points with an appropriate linkage e.g. nuclear waste is dangerous and it must be stored underground ; the isotopes in nuclear waste have long half-lives so they must be stored for a long time; • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation mentioning a range of points with appropriate linkages e.g. gamma rays from nuclear waste causes damage to cells so it must be stored away from where people live ; the isotopes in nuclear waste have long half-lives so they must be stored underground or in remote areas; • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	negative (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	(much) smaller than a neutron (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(b)(i)	An explanation linking • (friction/it) produces charges (at the end of the pipe) (1) • charge jumps to fuel tank (1) • (charge/friction) causes a spark (1) • can cause a fire /explosion (1)	static (electricity) builds up	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(b)(ii)	An explanation linking • (excess) charge / electrons (1) • Removed/ conducts away (1)	static charge discharged/ neutralised discharge current scores both marks	**(2)**

Question Number		Indicative Content	Mark
QWC	***6(c)**	An explanation etc. including some of the following points • static electricity • opposites charges attract • charges are different • induced charges • charges separate • charges move • electrons move • electrons move towards a positive charge / balloon / rod Allow credit for a correct explanation for an effect which is not given in the question. Allow credit for separation of charge being shown on a diagram.	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation. Explains the effect is caused by charges. e.g. the charge on the balloon pulls the water; the charge on the rod attracts the bits of paper; the balloon is rubbed to give it charge; opposites attract; positive and negative attract; • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation. Explains an effect is caused by opposite charges attracting or like charges repelling. e.g. the charge on the balloon is opposite to the charge on the water so they attract; the positive charges on the balloon attract negative charges on the girl's hair; • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation. Explains the effect is caused by induction, charge separation or moving electrons which leads to attraction between opposite charges. e.g. the electrons have been moved off the balloon so it has a positive charge and attracts the negative charge on the hair; the balloon has a positive charge and induces a negative charge on the stream of water which attracts it; • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total marks for question 6=12

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