Pearson

Mark Scheme (Results)

January 2018

Pearson Edexcel GCSE
In Physics (5PH2H)
Paper 01

edexcel

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	**A -** negative charge has moved from the cloth to the rod		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	An explanation linking they repel (1) (strips have) like charge (1)	 push away same (type of) charge ignore equal charge	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	An explanation linking any **two** from charges are separated (1) possibility of a spark (1) ignite the fuel (1)	ignore ref to electric shock pd (between plane and ground) cause fire / explosion	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	An explanation linking **three** From Metals /cables are (good) conductors (1) Electrons/(negative) charge can flow through wire (1) charge goes from/to the ground / earth (1) charge does not build up/dissipates/no spark possible (1)	 Reject flow of positive charge for this mark plane is earthed/grounded/no (build-up of) pd discharge the tank/aircraft/pipes	**(3)**

Question Number	Answer	Acceptable answers	Mark
2(a) (i)	B 120 counts per minute		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a) (ii)	Any one of the following Rocks Food Radon gas Cosmic rays Own bodies Fall-out Sun/stars (1)	Plausible named food such as coffee, brazil nut, bananas Space Specified medical/industrial use of x-rays Ignore smoke alarms, power stations (in normal use)	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a) (iii)	An explanation linking • personal circumstances such as geographical location nature of their work lifestyle (1) • the consequences such as radiation from radon gas/particular rocks/fall-out (eg Chernobyl) greater exposure to X-rays greater exposure to cosmic rays (1)	Ignore simply more radiation	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a) (iv)	D scientists have a better understanding of the dangers of radiation		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	Any one of the following: • Mutation of DNA • Ionisation of cells • (Increases risk of) cancer (1)	damage / mutate cells allow radiation sickness / poisoning	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(c) (i)	From the graph Time taken to fall (from 180 to) 90 (1) = 8 (days) (1)	Any other suitable pair of readings from graph 8.1, 8.2 Full marks for correct answer even if no working is evident	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c) (ii)	17.4 (days) (1)	17 to 18 (days)	**(1)**

Question Number	Answer	Acceptable answers	Mark
3 (a)	A description including the following points • steam {drives/turns} turbine (1) • (which){drives/turns/powers/is connected to} generator (1)	 transfers thermal energy to ke transfers ke to electrical energy or rotates a magnet in coils or coils in magnet accept dynamo for generator	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)	A description including the following points • neutron {hits / splits / is absorbed by} uranium (nucleus) (1) • producing more neutrons (1) • at least one neutron can {hit / split / be absorbed by} other uranium (nuclei) (1)	full marks may be scored on a labelled diagram fired at other U (nuclei) or "process repeats" must see word nucleus at least once for full marks	**(3)**

Question Number	Answer	Acceptable answers	Mark
3 (c)	An explanation linking • control rods absorb (more) neutrons(1) • decreases rate of fission (1)	 stop neutrons slow down the reaction Ignore "keep steady" (this is not changing the rate)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3 (d)	A barium-143		**(1)**

Question Number	Answer	Acceptable answers	Mark
3 (e)	An explanation linking the following points • nuclei are positively charged (1) • (need enough energy) to overcome repulsion (1)	ignore references to high temp and pressure accept same charge accept protons for nuclei accept atoms (must mention nuclei or protons or atoms) and will repel each other	**(2)**

Question Number	Answer	Acceptable answers	Mark
4 a	B momentum		**(1)**

Question Number	Answer	Acceptable answers	Mark
4b(i)	substitution (1) 90 = 60 x velocity transposition velocity = 90 / 60 (1) evaluation 1.5 (m/s) (1)	award full marks for correct answer with no working	**(3)**

Question Number	Answer	Acceptable answers	Mark
4 b(ii)	use of force = change in momentum ÷ time (1) evaluation (1) (force =) 23 (N)	accept F = ma together with a = (v – u)/t allow answer that round to 23 e.g. 23.3 (N) award full marks for correct answer with no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)	An explanation which uses conservation of momentum to link three from Mother and daughter have different mass (1) Momentum is conserved / is zero to start with (1) Both have same size/magnitude of momentum (after the push) (1) so speed of the daughter is greater than that of the mother (1)	An explanation based on Newton's laws and linking three from Each have a different mass (1) Each experience the same size force / action and reaction are equal (1) Each experiences a different acceleration (1) so speed of the daughter is greater than that of the mother (1)	**(3)**

Question Number	Answer	Acceptable answers	Mark
5(a)	☒ **A** **P**		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)	distance travelled = area under graph (1) substitution (1) ½ x 24 x 2.5 evaluation (1) 30 (m)	distance = average speed x time = 12 × 2.5 allow (distance) = speed × time OR 24 x 2.5 OR 60 for 1 mark give full marks for correct answer, no working	**(3)**

Question Number	Answer	Acceptable answers	Mark
5(c)	An explanation linking the following points • velocity is a vector (1) • (whereas) speed is not (1)	 velocity has magnitude and direction velocity has direction speed is a scalar speed has {no direction}/{magnitude only} allow for 2 marks velocity is speed in a straight line velocity = displacement / time NOTE answers in terms of momentum must still refer to vectors or direction to gain credit	**(2)**

Question Number		Indicative Content	Mark
QWC	***5(d)**	An explanation linking some of the following **Forces acting** • weight down • air resistance up (opposing motion) **Forces during fall** • weight constant • air resistance increases • with speed • resultant force = W – R **Effect on shape of graph** • at start, resultant force is large so acceleration large / gradient steep • mid resultant force decreasing so acceleration decreasing / gradient decreasing • terminal velocity, resultant force is zero so acceleration zero / gradient zero	**(6)**
Level	**Mark**	**Descriptor**	
	0	No rewardable content	
1	**1 - 2**	• a limited explanation linking a few facts from the indicative content. E.g. at terminal velocity, forces are equal so constant speed. • • 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 linking some of the indicative content to the shape of the graph e.g. At the start weight > air resistance so acceleration and at the end weight = air resistance so no acceleration • 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 linking most of the indicative content to the complete shape of the graph e.g. At the start weight > air resistance so acceleration. Then air resistance increases (with speed) so acceleration decreases. At the end weight = air resistance so no acceleration. • 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)	substitution (1) potential difference = 0.4 x 15 (Ω) evaluation 6.0 (V) (1)	give full marks for correct answer, no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
6 (a) (ii)	☒ **C** 1 joule per coulomb		**(1)**

Question Number	Answer	Acceptable answers	Mark
6 (a) (iii)	0.20 (A) (1)	0.2, 0.2A, 0.20, 0.20A, 0.2 amps, 0.20 amps	**(1)**

Question Number	Answer	Acceptable answers	Mark
6 (b)	An explanation linking (more) collision of electrons (1) with other electrons /ions / lattice (1)	 (more) kinetic/electrical energy is transferred to thermal /heat energy	**(2)**

Question Number		Indicative Content	Mark
QWC	***6(c)**	An explanation linking some of the following. • Resistance (of LDR or circuit) would increase with less ambient light • less current is used at night-time • Higher resistance will allow less current (in the circuit) (ORA) • Less current in circuit means less energy transferred from the battery (per second) • Less power required in the dark ORA for light conditions • Dimmer lights (at night-time) means less energy transferred from battery (per second) • Total energy transferred is less during night time (than it would otherwise have been) due to the higher resistance of the LDR	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited explanation EITHER linking the light level to EITHER resistance OR current. OR linking reduced current with less energy/ power from the battery. e.g. It increases the resistance in the dark. • 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 linking the light level to TWO of resistance, current, energy. e.g. At night-time its resistance would increase. This would reduce the current from the battery • 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 linking the light level to resistance AND current, AND energy. e.g. At night-time the resistance would be more. This would reduce the current and mean that the battery will not have to supply as much energy. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

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