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Mark Scheme (Results)

June 2011

International GCSE

Physics (4PH0) Paper 2P

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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.

INTERNATIONAL GCSE PHYSICS 4PH0/2P – SUMMER 2011

Question number	Answer	Notes	Marks
1 (a) (i)	B - Moon		1
(ii)	C - Planet		1
(iii)	B - Gravity		1
(b) (i)	Milky Way		1
(ii)	Universe		1
(c)	A – surface of the Moon		1
(d)	C – N/kg		1

Total 7 marks

Question number	Answer	Notes	Marks
2 (a)	Place compass in field and observe the needle ; Make marks to record (field) ; ALLOW use of >1 compass / pencil Repeat process / join marks to make >1 line ;	e.g. "Place the compass next to the magnet and look where the needle points." e.g. "Place the compass next to the magnet and look where the needle points. The line is marked using a pencil and paper method (i.e. dots or arrows)" e.g. "Place the compass next to the magnet and look where the needle points. The line is marked using a pencil and paper method (dots or arrows). This is repeated for another line / in a different place" ALLOW use of iron filings for 1 mark	3
(b)	A correct field line ; Correct direction of field shown i.e. an arrow from N to S ; At least two correct complete lines, but not touching / crossing;	ALLOW incomplete line IGNORE field lines inside the magnet REJECT inconsistent / incorrect arrows	3

Total 6 marks

Question number	Answer	Notes	Marks
3 (a)	Idea of <u>electron</u> transfer ;	REJECT proton movement	2
	Due to friction / lightning ;	ALLOW rubbing / description of friction / flying through charged clouds	
(b)	Idea of spark / ignition / fire / explosion ;	IGNORE refs to electric shock IGNORE refs to charge jumping / escaping	1
(c)	(Connect to) earth / ground ;	ALLOW earthing / grounding	1
(d)	Idea of charge / current flowing in wire ;		2
	Discharges aircraft / no charge is left / no p.d. remains ;	ALLOW no overall charge / (aircraft) neutral IGNORE further discussion of danger ACCEPT "<u>all</u> charge goes to earth" for 2 marks	

Total 6 marks

Question number	Answer	Notes	Marks
4 (a)	Digital: only set values allowed ; Analogue: any value allowed / 'continuously variable' ;	ACCEPT Idea of on-off OR 1-0 for digital signal REJECT 'varies' alone / 'continuous' alone / 'varies within a range' REJECT refs to frequency ACCEPT information in diagrams e.g. labelled correct waveforms	2
(b)	easier to remove noise / can regenerate / may carry more information / more stations / easier to store /copy / use with computers ;	ALLOW can be cleaned IGNORE 'less noise' alone REJECT carries information faster REJECT easier to amplify IGNORE refs to quality / clarity of sound	1
(c)	Any **three** from: Waves spread out (as they leave the speaker) ; (Different frequencies / notes have) different wavelengths ; Diffract most if speaker size matches wavelength ; Giving a more even sound (if all frequencies diffract equally) ;	 ACCEPT this idea on a diagram ACCEPT this idea on another diagram e.g. "high and low frequencies have same loudness" OWTTE	3

Total 6 marks

Question number	Answer	Notes	Marks
5 (a)	15 (N)		1
(b) (i)	Scale on axes is linear - 1 mark Axes labelled with scales and units - 1 mark Plotting to nearest half-square (minus one for each plotting / scale error, up to max 2 marks) - 2 marks Line (straight) of best fit acceptable - 1 mark	ALLOW 'mass' / 'scale reading' for y-axis Bar charts: can only score S, A and P marks (4 max)	5
(ii)	(4, 3.7) identified / circled ;		1
(c)	Any **four** from: <u>Data</u> • There is an obvious error / anomaly / inconsistency in the readings ; • The data on the tin may be wrong ; • The extension of spring might not be linear / broken scales / scales not obeying Hookes Law ; • There is a zero error ; • There could be reading error / parallax error ; <u>Methods</u> • The conclusion was based on just one pair of readings ; • The experiment was not repeated ; • The weight of tins / bag was not taken into account ; • (0 – 5kg is an) inadequate range to measure schoolbag ;		4

Total 11 marks

Question number	Answer	Notes	Marks
6 (a) (i)	373 (K);	IGNORE any decimal places / degree sign REJECT negative values	1
(ii)	More (kinetic) energy / more quickly / faster / further apart (in steam) ; ACCEPT more freely	ACCEPT reverse argument for water REJECT vibration NB Must be a comparison	1
(iii)	Any **three** from: (Molecules) in motion / moving ; Bounce off / hit / collide with / strike inside of kettle ; Momentum changes ; There is a force (on the inside) ; pressure = force ÷ area OWTTE ;	 IGNORE molecules hitting each other IGNORE push	3
(b)	Substitution $130 \times 820 = 101 \times V_2$ OR OR Rearrangement $V_2 = (130 \times 820) \div 101$; Answer $= 1060\ (cm^3)$;	Correct answer with no working gets both marks ACCEPT 1055 (cm^3) / or with further dp after 1055 (cm^3)	2
(c)	Pressure decreases; Any **one** from: Molecules move more slowly / have less kinetic energy ; Molecules hit sides with less frequently / often ; Less momentum change / force produced (per collision or overall) ; Pressure is proportional to temperature / P α T (for constant volume) ;	NB "pressure increases / stays the same" scores zero for question	2

Total 9 marks

Question number	Answer	Notes	Marks
7 (a)	momentum = mass x velocity OR 72 x 8 ; Calculation 580 (kg m/s);	Or equivalent rearrangement ACCEPT use of standard abbreviations i.e. p = mv ALLOW 576 (kg m/s)	2
(b)	Substitution 920 ÷ 0.17 ; Calculation 5400 (N) ;	REJECT Alternative incorrect unit for 1 mark ACCEPT 5410 / 5412 / 5411.7…… 5411.8 REJECT 5411	2
(c) (i)	Any **two** from: <u>Road</u> Weather-related e.g. wet / dry / rainy / icy ; Surface-related e.g. gravel / mud / freshly tarmaced / oily ; Gradient e.g. uphill / downhill ; <u>Car</u> Mechanical e.g. quality of tyres / brakes ; Momentum-related e.g. speed / number of passengers / mass ; <u>Driver</u> State of alertness e.g. tired / alcohol / drugs / mobile phone / other distractions ; Reaction time ;	 ALLOW slippery if qualified	2

7 (c) (ii)	Any **three** from: • Car (and driver) take longer to slow down / time for crash increases ; • Momentum changes / decreases ; • Rate of change of momentum (and thus force) reduced ; • <u>Smaller force</u> leads to less severe injuries ; **OR** • Driver travels further in crash / for a longer time ; • Acceleration / deceleration (and thus force) is lower ; • Rate of change of momentum (and thus force) reduced ; • <u>Smaller force</u> leads to less severe injuries ;	ALLOW reverse arguments e.g. "If no crumple zone…" NB "change of momentum, divided by time is <u>less</u>" scores two marks	3

Total 9 marks

Question number	Answer	Notes	Marks
8	Any **six** from: <u>Single fission described</u> Neutrons captured / absorbed / metastable / unstable state ; Causes break-up of nucleus / daughter nuclei ; Releasing energy ; Releasing neutrons ; <u>Further fissions described</u> (Spare) neutrons can cause further fissions ; In a chain reaction ; <u>Control described</u> Moderator to slow down neutrons / increases rate ; Control rod 'mops up' / absorbs neutrons / reduces rate ; Control rods can be inserted / removed ; <u>Energy harvesting described</u> (Energy released) used to heat water ; A heat transfer mechanism mentioned ;	REJECT (for 1 mark) Confusion of electrons and neutrons REJECT (for 1 mark) Fission of <u>atoms</u> / <u>molecules</u> / <u>cells</u> ACCEPT points shown in a clear and labelled diagram	6

Total 6 marks

PAPER TOTAL: 60 MARKS

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