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Mark Scheme (Results)

Summer 2015

Pearson Edexcel International GCSE Physics (4PH0) Paper 2P

Pearson Edexcel Level 1/Level 2 Certificate Physics (KPH0) 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.

Question number	Answer	Notes	Marks
1 (a)	cooking – micro(waves) OR infrared (waves); treating cancer – ultraviolet OR x-rays OR gamma (rays); identifying broken bones - x-rays;	if more than one example given for each use then reject mark if any incorrect	3
(b)	C - the same speed;		1
(c) (i)	drawn ray shows refraction in the correct direction (downwards) at **both** surfaces; drawn ray is above yellow ray and diverges from it (if ray had entered at the original point);	judge by eye ignore arrows and labels dependent on previous allow if ray drawn enters **parallel** to original ray	2
(ii)	A- black;		1

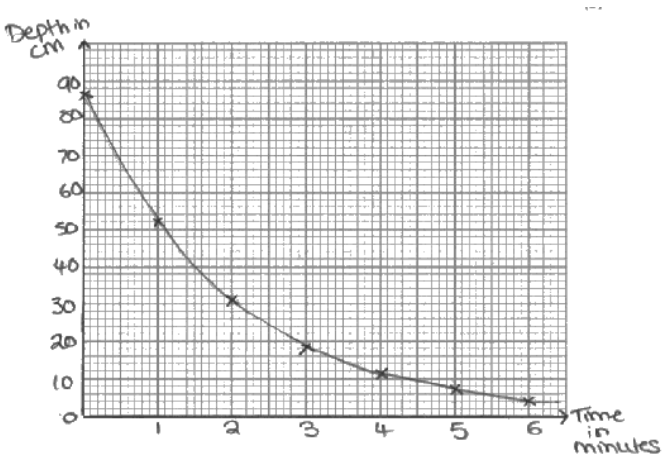
Total 7 marks

Question number	Answer	Notes	Marks
2 (a) (i)	B - 960 joules per second;		1
(ii)	power = current x voltage;	allow equation as correct symbols and/or rearrangement e.g. I = P ÷ V	1
(iii)	appropriate calculation (including substitution OR rearrangement); answer to at least 2 sf seen anywhere; e.g. 960 = I × 230 (I =) 4.2 (A)	using 4 (A) to calculate power (920 W) or voltage (240 V) scores 1 mark max. (4.17391) allow 4.1 (A)	2
(b) (i)	any 3 of: MP1. large **current** to earth / in earth wire; MP2. fuse blows / melts / breaks; MP3. idea that circuit is broken; MP4. idea that the risk of shock is reduced / prevented;	ignore references to electricity or charge allow 'current surge' for large current 'ground' for earth ignore references to fire	3
(ii)	D - 13 A;		1
(c)	MP1. a way of measuring current e.g. ammeter; MP2. a **method** to vary current in fuse; MP3. a **method** of identifying that the fuse has broken e.g. lamp goes out, idea that current falls to zero etc.;	accept any points seen in diagram allow data logger allow **variable** power supply, **variable** resistor	3

Total 11 marks

Question number	Answer	Notes	Marks
3 (a)	A - Force X 7.5 N, Force Y 7.5 N ;		1
(b)	idea that force X decreases; from 15 (N) / to 0 (N);	ignore references to force Y and moments 'it goes from 15 to 0' gets 2 marks	2

Total 3 marks

Question number	Answer	Notes	Marks
4 (a)	metre rule(r); stop watch / stop clock;	allow (metal) tape measure / measuring tape / metre stick ignore timer either order	2
(b) (i)	suitable scale chosen (>50% of grid used); axes labelled with quantities and unit; plotting correct to nearest half square (minus one for each plotting error);; line (curve) of best fit acceptable;  	reject 'm' for minutes orientation unimportant i.e. two plotting errors = no marks for plotting i.e. smooth curve within 1 small square of each point time in minutes / water depth in cm 0 / 86 1 / 52 2 / 31 3 / 18 4 / 11 5 / 7 6 / 4	5
(ii)	idea that **depth** decreases with time; idea that relationship is non linear;	allow RA ignore 'negative correlation' Ignore all references to 'proportional' and 'curved' allow idea of rate arguments e.g. 'depth decreases more slowly with time' gets 2 marks allow exponential decrease for 2 marks	2

(c)	any 1 of: MP1. idea of pressure decreasing (with depth / time); MP2. idea of force changing with {pressure / depth / time}; MP3. idea of (available) GPE decreasing;	 allow RA allow ‘weight’ for force ignore ‘mass’	1

Total 10 marks

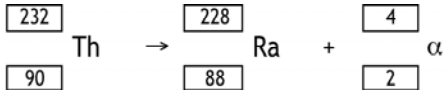
Question number	Answer	Notes	Marks
5 (a) (i)	momentum = mass × velocity;	allow symbols and rearrangements e.g. p = m × v	1
(ii)	substitution into correct equation; evaluation; e.g. (momentum =) 0.23 × 13 = 3.0 (kg m/s)	 allow 3, 2.99	2
(b)	explanation in terms of conservation of momentum OR Newton's third law **conservation of momentum** - any 3 of: MP1. mention of conservation of momentum; MP2. momentum of snowball **and** skater; MP3. (are) equal and opposite; MP4. because momentum initially zero; OR **Newton's third law** - any 3 of: MP1. mention of {action and reaction / Newton III law}; MP2. forces on skater **and** snowball; MP3. (are) equal and opposite; MP4. idea that (magnitude of) rate of change of momentum is same for both forces;	 allow 'her' or similar to mean the skater allow e.g. -3.0 (kg m/s) allow 'her' or similar to mean the skater condone 'push' for force **if no other mark awarded**, allow 'because there is no / little friction' for 1 mark	3

(c)	explanation in terms of momentum OR acceleration OR pressure **momentum** - any 3 of: MP1. idea of increased time (of impact); MP2. **same** change in momentum; MP3. force is rate of change in momentum; MP4. reduces force (on knee); OR **acceleration** - any 3 of: MP1. idea of increased distance/time (to slow down); MP2. **same** change in velocity / speed; MP3. reduces acceleration; MP4. reduces force (on knee); OR **pressure** - any 3 of: MP1. idea of increased area (in contact with ground / knee); MP2. reduced force; MP3. pressure = force ÷ area; MP4. reduces pressure (on knee);	allow F = change in momentum ÷ time allow same force symbols	3

Total 9 marks

Question number	Answer	Notes	Marks
6 (a)	any 3 of: MP1. idea of {rubbing / tearing} of {materials / surfaces}; MP2. idea of movement / transfer of electrons; MP3. electrons have negative charge; MP4. (object becomes) negatively charged by gaining electrons OR positively charged by losing electrons; MP5. need for insulating material(s);	movement of positive {charge / electrons} can only score MP1 and MP5 ignore 'friction'	3
(b)	any 2 of: MP1. idea of **opposite** charges OR positive and negative charges; MP2. idea of attraction; MP3. idea of an (attractive) force larger than the weight of the loose end of tape;	reject if mentions positive electrons ignore 'different' condone 'unlike'	2

Total 5 marks

Question number	Answer	Notes	Marks
7 (a)	top line correct e.g. 228; bottom line correct e.g. 88 and 2; e.g.  		2
(b) (i)	idea that {alpha/beta} is {absorbed by / unable to penetrate} {aluminium / glass};	allow stops / blocks for absorbs ignore references to paper, air, lead ignore references to gamma, unqualified 'radiation'	1
(ii)	any 2 of: MP1. idea of radiation being ionising; MP2. (radiation) causes cancer / cell mutation / kills cells / blindness; MP3. {alpha / beta} will travel this short distance (between lens and eye); MP4. idea that astronomer is likely to suffer prolonged exposure;	ignore references to gamma allow (eye) within penetrating range of {alpha / beta}	2

Total 5 marks

Question number	Answer	Notes	Marks
8 (a) (i)	step-down (transformer);		1
(ii)	MP1. soft material **loses** magnetism **quickly** / **easily**; MP2. idea that magnetic field (in core) alternates / changes;	ignore unqualified references to losing magnetism	2
(b) (i)	$\frac{\text{input / primary voltage}}{\text{output / secondary voltage}} = \frac{\text{primary turns}}{\text{secondary turns}}$	allow • equation in words with turns ratio shown as a fraction • standard abbreviations :- s, p, in, out, 1, 2 • N or n for number of turns (condone T for number of turns) • "number of coils" for number of turns rearrangements also to include turns ratio as a fraction $(V_S/V_P) = (N_S/N_P)$ [equation inverted] $V_S = (V_P)(N_S/N_P)$ [V_S as subject] $V_P = (V_S)(N_P/N_S)$ [V_P as subject]	1
(ii)	substitution into a correct equation; evaluation (including rearrangement); e.g. 44 / V = 520 /30 (V =) 2.5 (V)	allow 3, 2.53, 2.54, 2.538	2

(c) (i)	idea of a (frequency) limit / range to (human) hearing OR (frequency) is {too high / ultrasound}; mention of upper limit as 20 000 Hz;	ignore references to lower limit allow 20 kHz ignore references to lower limit	2
(ii)	conversion of unit; substitution and evaluation; e.g. t = 1.5 ms = 0.0015 s (f =) 1/0.0015 = 670 (Hz)	allow 1000 or 0.001 in working, if no other mark can be given allow correct rounding only e.g. 700, 667, 666.7, 666.6 (recurring) 1 mark max for POT error e.g. 0.67, 6.7, 67 etc.	2

Total 10 marks

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