



Mark Scheme (Results)

Summer 2012

International GCSE

Physics (4PH0) Paper 2P

Edexcel Level 1/Level 2 Certificate

Physics (KPH0) Paper 2P

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information, please visit our website at www.edexcel.com.

Our website subject pages hold useful resources, support material and live feeds from our subject advisors giving you access to a portal of information. If you have any subject specific questions about this specification that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

www.edexcel.com/contactus

Pearson: helping people progress, everywhere

Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2012

Publications Code UG032772

All the material in this publication is copyright

© Pearson Education Ltd 2012

INTERNATIONAL GCSE PHYSICS PAPER 2P – SUMMER 2012

Question number	Answer	Accept	Reject	Marks
1 (a) (i)	C (planet);			1
(ii)	A (comet);			1
(b)	C (gravitational force);			1

Total 3 marks

Question number	Answer	Accept	Reject	Marks
2 (a) (i)	3;	Three /3.0		1
(ii)	0.002 (s) / 2 <u>m</u> s ; 500 (Hz) / 0.5 <u>k</u> Hz	0.001 ecf only if 2ai=6 correct answer without working for 2 marks 1000 ecf only if 2ai =6		2
(b)	All of waves at smaller amplitude (can vary); All of complete waves at higher frequency (can vary);	Any wave form Accept two diagrams that clearly show the candidate's intention		2

Total 5 marks

Question number	Answer	Accept	Reject	Marks
3 (a)	Line that shows direction of the magnetic force/field;	Line that shows the way a compass would point Line from (N) pole to (S) pole Ignore Line between poles		1
(b) (i)	Arrows on two or more lines from N to S and/or clockwise on loops around wire;	Accept arrows beside lines showing correct directions	Contradicting arrows (i.e. one correct and one incorrect)	1
(ii)	Arrow horizontal (by eye) ; Pointing to the right;	Arrow not passing through wire Unlabelled arrow if clear		2
(c)	Field (in square) is not uniform; Field direction is constant / field lines are parallel/same direction;	Ignore lines are straight Field is stronger towards the right /nearer the wire / where the lines are close together ORA for 2 marks		2

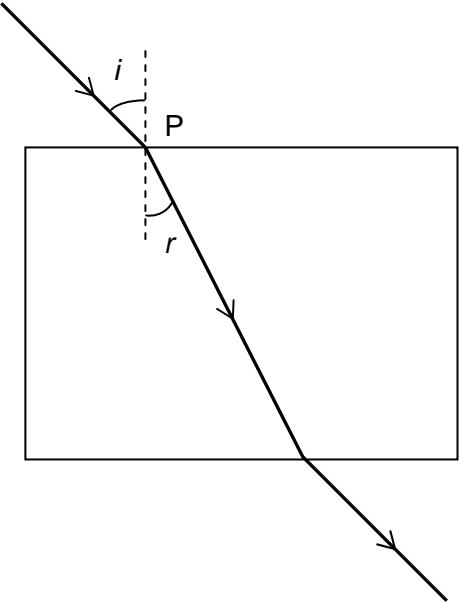
Total 6 marks

Question number	Answer	Accept	Reject	Marks
4 (a) (i)	Anomaly clearly identified (20.44 mm);			1
	(ii) Averaging seen $162.7 \div 8$ $142.26 \div 7$; Anomaly excluded/ $\div 7$ seen ; Final answer rounded to 2 decimal places; e.g.: 20.32 (mm)	Ignore sig figs in working Allow full marks for correct answer, no working, i.e.: 20.32 (mm) = 3 marks If no working accept these other bald answers: 20.3228.. etc (mm) = 2 marks 20.34 (mm) = 2 marks 20.3375.. (mm) = 1 mark 20.33 (mm) = 1 mark		3

Question number	Answer	Accept	Reject	Marks
4 (b)	<p>Any two of:</p> <p>Yes / No (no mark)</p> <p>MP1 Good way of measuring small values / Measures a larger value;</p> <p>MP2 Taking a larger measurement might reduce (%) errors;</p> <p>MP3 Not actually measuring what is required (a particular coin);</p> <p>MP4 Possible to make a maths error e.g. when dividing / counting / rounding;</p> <p>MP5 Not all coins are necessarily the same / idea of anomalous coin / bent / worn;</p>	<p>Accept reverse arguments</p> <p>Ignore comments about human error</p> <p>Ignore reference to caliper precision</p> <p>Ignore comments about gaps</p>		2

Question number	Answer	Accept	Reject	Marks
4 (c)	<p>Any three of:</p> <p>MP1 Measure/find <u>mass</u>;</p> <p>MP2 Using a named instrument - e.g. (top pan) balance, scale(s);</p> <p>MP3 A sensible experimental precaution: e.g. Repeat readings / measure mass of several of coins and divide/ check balance zero;</p> <p>MP4 Formula to use (density = mass \div volume);</p> <p>MP5 A correct <u>density</u> unit mentioned (e.g. kg/m³);</p>	<p>Ignore information about calculating or finding volume</p> <p>Accept "Weighing" to find <u>mass</u></p> <p>Ignore measuring weight</p> <p>Ignore volume = $\pi r^2 h$</p>		3

Total 9 marks

Question number	Answer	Accept	Reject	Marks
5 (a)	<p>Refraction into glass towards the normal ($r > 0$);</p> <p>Angle of incidence <u>and</u> angle of refraction both labelled correctly at the same surface;</p> <p>Refraction at the lower surface into air away from the normal;</p> <p>Emergent ray parallel to incident ray after correct refraction (by eye);</p> 	<p>Accept dotted lines Ignore any reflections</p> <p>Ignore a second incorrectly labelled pair</p>		4

Question number	Answer	Accept	Reject	Marks								
5 (b) (i)	One mark for either sin <i>i</i> or sin <i>r</i> correct; <table border="1" data-bbox="483 316 1099 555"> <tbody> <tr> <td><i>i</i></td> <td>60°</td> </tr> <tr> <td><i>r</i></td> <td>34°</td> </tr> <tr> <td>sin <i>i</i></td> <td>0.87</td> </tr> <tr> <td>sin <i>r</i></td> <td>0.56</td> </tr> </tbody> </table>	<i>i</i>	60°	<i>r</i>	34°	sin <i>i</i>	0.87	sin <i>r</i>	0.56	sin <i>i</i> = 0.866; sin <i>i</i> = 0.8660; sin <i>r</i> = 0.559; sin <i>r</i> = 0.5592; Ignore degree sign Ignore any other values		1
<i>i</i>	60°											
<i>r</i>	34°											
sin <i>i</i>	0.87											
sin <i>r</i>	0.56											
(ii)	$n = \sin i \div \sin r$;	Accept refractive index = sin <i>i</i> ÷ sin <i>r</i>		1								
(iii)	Two marks for correct answer Refractive index = 1.55;; Or Refractive index = 1.6;; Or Refractive index = 1.5;;	Accept for one mark only any other value in the range 1.5 < <i>n</i> < 1.6; Any power of 10 error, e.g. 155.36;		2								

Question number	Answer	Accept	Reject	Marks
5 (c)	<p>Any three of:</p> <p>MP1 any mention of repetition / take an average of readings;</p> <p>MP2 vary i to obtain more values ;</p> <p>MP3 plot a graph of <u>$\sin i$ against $\sin r$</u> ; OR Calculate/work out/ find n;</p> <p>MP4 find gradient of graph ; OR Calculate average of n;</p> <p>MP5 sensible experimental precaution / improvement to method (e.g. mark lines on paper, thinner beam, fix block firmly in position, remove anomalies, sharper pencil, use a more precise protractor e.g. $\frac{1}{2}^\circ$);</p>	<p>Ignore reference to critical angle</p> <p>Ignore second glass block</p> <p>Ignore different colours</p>		3

Total 11 marks

Question number	Answer	Accept	Reject	Marks
6 (a)	(i) voltage = current x resistance;	$V = I \times R$ Accept rearrangements		1
	(ii) Substitution and rearrangement (of correct equation); Answer given to at least 3 s.f.; e.g. $230 / 22$ $= 10.45 \text{ (A)} \quad (\approx 10 \text{ A})$	Ignore calculations of voltage or resistance 10.5 A (= 10 A)		2
(b)	(i) Any two of: MP1 As a safety device / reduces danger /reduces hazards; MP2 In case of fault / short; MP3 Idea of excessive current; MP4 Prevents (wires or appliance) overheating/fire;	Ignore any reference to electric shock More than 13A		2
	(ii) MP1 Because total current (in motor and heater) is more than 2A; MP2 A 2 A fuse would blow / melt / would need to be replaced / circuit would be broken;	Accept reverse arguments		2

Total 7 marks

Question number	Answer	Accept	Reject	Marks
7 (a)	(i) Work done = force x distance (in direction of force);	$W = F \times d$ $d = W / F$ $F = W / d$		1
	(ii) Substitution (in correct equation); Answer; e.g.: $W = 1.7 \times 0.46 = 0.78$ (J);;	0.782		2
	(iii) Response must match 7a(ii) ; e.g. 0.78 ;	Accept word answer e.g. "the same"		1
(b)	(i) KE is zero /less / decreased;	No KE The KE is transferred (to other forms)		1
	(ii) Centre of gravity is lower;	Centre of mass is lower Height is lower <u>and</u> reference to mgh		1

Total 6 marks

Question number	Answer	Accept	Reject	Marks
8	<p>An explanation including any five of these ideas (in any order):</p> <p>MP1 alpha particles have less penetrating power /less range ;</p> <p>MP2 alphas have more charge;</p> <p>MP3 alphas cause more ionization;</p> <p>MP4 alphas are bigger / have more mass;</p> <p>MP5 (slowing) force on alpha particles is larger;</p> <p>MP6 (kinetic) energy of alpha lost quickly causing ionization;</p> <p>MP7 (larger) alpha particles are more likely to collide with atoms;</p>	<p>Accept reverse arguments, e.g. beta particles have more penetrating power etc</p> <p>Ignore comparisons of energy/ velocity/ momentum</p>		5

Total 5 marks

Question number	Answer	Accept	Reject	Marks
9 (a) (i)	momentum = mass x velocity;			1
(ii)	Substitution into correct equation; Calculation; e.g. momentum = $0.15 \times 6 = 0.9$;; Unit: kg m/s;	kg ms ⁻¹ Ns		3
(iii)	$0.9 = (0.15 + 0.05) \times v$; $v = 0.9 \div 0.2 = 4.5$ (m/s);	Ecf from 8(a) (ii) (i.e. answer for 8a(ii) \div 0.2 or answer for 8a(ii) \times 5)		2
(b)	The student is wrong; Because variables are not controlled; e.g. mass of cloth different, mass of (other) tins different, cloth velocity not measured	Student is right if the mass of the second cloth is 0.3 kg;; Student is right if the momentum of the second cloth is 1.8 kg m/s;; (assuming all tins are 0.05 kg/ throws new cloth with exactly the same velocity)		2

Total 8 marks

PAPER TOTAL: 60 MARK

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email publication.orders@edexcel.com

Order Code xxxxxxxx Summer 2012

For more information on Edexcel qualifications, please visit our website
www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual
■■■■■■■■■■



Llywodraeth Cynulliad Cymru
Welsh Assembly Government

