edexcel

Mark Scheme (Results)

January 2012

International GCSE Physics (4PH0)
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 call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our qualifications website at www.edexcel.com. For information about our BTEC qualifications, please call 0844 576 0026, or visit our website at www.btec.co.uk.

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.

Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

Alternatively, you can speak directly to a subject specialist at Pearson about Edexcel qualifications on our dedicated Science telephone line: 0844 576 0037

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 raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2012
Publications Code UG030780

INTERNATIONAL GCSE PHYSICS 4PH0 2P – JANUARY 2012

Question number	Answer	Notes	Marks
1 (a) (i)	D		1
(ii)	C		1
(b)	f = 1/T (NO MARK) f= 1/5; 0.2 (Hz);	Bald 0.2 (Hz) scores 2 marks	2

Question number	Answer	Notes	Marks
2 (a)	something to measure length; e.g. (metre) rule(r), tape measure, trundle/click wheel, pedometer, step counter	If more than two responses given, each incorrect response negates a correct response Ignore ticker-tape, ticker-timer, video	1
	something to measure time; e.g. stopwatch, stopclock, timer		1
(b)	Correct plotting (ignoring 0,0); Line joins (10,14) to origin; Smooth curve (by eye) to right of (10,14)	 Allow ecf on plotting Ignore any kink at (10,14)	3
(c)	26 (m)	Ecf from graph in (b) Allow ± 0.5 (half a small square)	1
(d) (i)	slowed down	Reject: accelerates <u>and</u> slows down	1
(ii)	graph becomes less steep / levels off	Allow description based on figures from graph	1

Question number	Answer	Notes	Marks
3 (a)	electrons; negative;		2
(b) (i)	(droplets) repel each other / repulsive force / like charges repel; (droplets) spread out / finer spray;	Ignore: attraction of paint to object Ignore: references to paint sticking	2
(ii)	Any two from (object) attracts droplets /paint OR opposite charges attract; paint reaches back of object / obscured places (at same time); less paint wasted;	Ignore: references to paint sticking	2
(c)	risk of spark / shock /damage; related risk reduction; e.g. earth connection, appropriate use of insulation	Accept: lightning, fire, explosion, Reject: risks from current electricity risk reduction method needs to apply to stated risk Accept: earthed, earthing, grounding, rubber gloves Reject: “rubber earth strip (under cars)”	2

Question number	Answer	Notes	Marks
4 (a)	Any three of evaporation as liquid→ gas/vapour; higher (kinetic) energy/faster particles/molecules leave/ evaporate; reducing (average) energy of particles left /heat remaining; reducing temperature;	 Accept: water/sweat → gas/vapour Accept: particles leaving take heat with them Accept: lower energy particles remain	3
(b) (i)	(still covered in) sweat /evaporation mentioned; not generating as much 'new' heat;	Ignore: conduction, convection and radiation losses Ignore: reference to shiny sheet	2
(ii)	Either barrier to reduce particle movement; reducing convection / evaporation; OR (shiny) surface reflects/poor absorber; reducing radiation /IR losses;	Ignore: conduction losses Accept: barrier to air currents / air is trapped	2

Question number	Answer	Notes	Marks
5 (a)	A method involving a suitable measurement or comparison; An appropriate check for horizontality; e.g.: measure height between ruler and bench in several places; height readings consistent; OR set a marker level with pivot; same height as end of ruler; OR place spirit level on ruler; bubble should be central; OR measure angle between stand and ruler; check for right angle	Allow assumption that bench is horizontal and /or stand is vertical Allow alternative methods and checks that would work	2
(b) (i)	moment = force x (perpendicular) distance (from pivot)	or equivalent	1
(ii)	2 x 60 / 2 x 0.6; 120 / 1.2; N cm / N m;		3
(c) (i)	mass / weight of ruler; weight acts downwards /increases (clockwise) moment;	 Allow: idea that forcemeter also supports ruler	2
(ii)	off scale on the forcemeter		1

Question number	Answer	Notes	Marks
5 (d)	Explanation including: clockwise and anticlockwise moments equal; (and fish are) closer to A; <u>so</u> to get same moment for smaller distance (force must be larger);	Accept similar points made using mathematical symbols e.g. taking moments – $F_A x = F_B y$ reworking – $F_A = (y/x)F_B$ $y > x$ (so $F_A > F_B$) i.e idea that force and distance are inversely proportional	3

Question number	Answer	Notes	Marks
6 (a) (i)	B turbine		1
(ii)	C generator		1
(b) (i)	power = voltage x current	Allow: equivalent arrangements Allow: P=IV etc Reject use of units for quantities	1
(ii)	Correct equation (any arrangement); e.g.: power in = power out / $V_{IN}I_{IN} = V_{OUT}I_{OUT}$ / $I_{IN}/I_{OUT} = V_{OUT}/V_{IN}$ Correct substitution; e.g.: V_{OUT}/V_{IN} = 115/25 (or 4.6) OR I_{OUT}/I_{IN}= 25/115 (or 0.22) Correct deduction based on working: e.g. output current is smaller	Accept: 5/23 and correct conversion to volts Bald 'output current smaller' = 0 mark Bald 'output current 4.6 times smaller' = 3 marks	3
(iii)	(lower current leads to) less (resistive) energy /heat/ power losses		1

Question number	Answer	Notes	Marks
6 (c)	ANY FOUR FROM Radioactive / emits radiation; High activity; Long half live / need for long term storage; Danger / harm to people /environment; Expensive to contain / dispose of; Need for security /shielding / burial; Social aspect eg. location of storage;		4

Question number	Answer	Notes	Marks
7 (a)	any four from – (at lower temp) particles move at lower speed / lower kinetic energy; on average; so hit sides less often / with less energy; reducing force / pressure; tension in rubber; pulls balloon material into smaller size;	Accept: momentum arguments	4

Question number	Answer	Notes	Marks
7 (b)	Any three explanations of faulty method, with a workable improvement. Note that the fault needs to be properly identified, not just “the method is faulty / inadequate”, or the method numbered with a comment that “Step 2 is wrong” <u>Fault #1</u> 'different time in freezer' does not give range of temps / always cools to same temp; <u>Improvement #1</u> Way to get range of temp ; e.g use water bath(s), use freezer(s) set to different temps <u>Fault #2</u> Difficult /hard to 'measure temp of balloon with thermometer' OR this doesn’t measure temp of gas inside; <u>Improvement #2</u> Measure temperature of surroundings ; e.g. inside of freezer, water bath or air <u>Fault #3</u> Measuring / plotting ‘size' is imprecise /too vague; <u>Improvement #3</u> measure / plot a more precise quantity; e.g. volume / length / diameter / circumference	CREDIT any explanation OR improvement, up to three of each, wherever seen i.e. the “Fault” and “Improvement” marks do not have to form a matching pair. Allow answers that mention high and/or low temperatures Needs to be more than: can’t + statement from stimulus Ignore reference to room temperature Not temperature	max 6

	Fault # 4 'measure size next to ruler' is an inaccurate method / difficult to measure (with a ruler) / comment on shape ; Improvement # 4 Sensible method to measure (a relevant quantity); e.g. measure volume by displacing water, measure circumference using tape/string, use set squares with ruler Fault # 5 repeating does not make it a fair test; Improvement # 5 control a named variable that does; e.g. starting volume of balloon Fault # 6 balloon may warm up between leaving the freezer and being measured; Improvement # 5 method of minimising this; e.g. idea of measuring quickly, having whole experiment at the measured temperature	Allow mention of parallax NOT “time in freezer”	

PAPER TOTAL: 60 MARKS

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 January 2012

For more information on Edexcel qualifications, please visit
www.edexcel.com/quals

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

Rewarding Learning