Mark Scheme (Results)

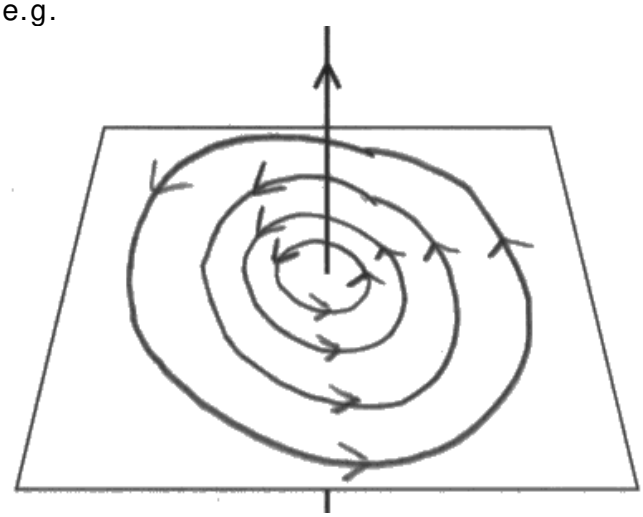
Summer 2017

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

Pearson Edexcel Level 1/Level 2 Certificate
in Physics (KPH0) Paper 2P

Question number	Answer	Notes	Marks
1 (a)	B – mass; **The only correct answer is B** A is not correct because it's a vector C is not correct because it's a vector D is not correct because it's a vector		1
(b)	A – acceleration; **The only correct answer is A** B is not correct because it's a scalar C is not correct because it's a scalar D is not correct because it's a scalar		1
(c)	B; **The only correct answer is B** A is not correct because the ball would be accelerating as it falls C is not correct because the ball would be accelerating as it falls D is not correct because the ball would be falling at a constant velocity		1

Total for question 1 = 3 marks

Question number	Answer	Notes	Marks
2 (a) (i)	MP1. single circle centred on the wire and parallel to the plane of the card; MP2. at least two concentric circles; MP3. anti-clockwise direction arrow marked on at least one line; e.g. 	allow gap where circle crosses wire circles do not have to stay within the card DOP ignore spacing reject if contradicting arrows	3
(ii)	EITHER: MP1. iron filings used; MP2. tap card / eq.; OR MP1. (plotting) compass used; MP2. multiple compasses used / compass moved to new position; OR MP1. use of a magnet / another current-carrying conductor; MP2. to produce a force / movement;	ignore references to magnets, other current-carrying wires being used allow iron powder, steel dust etc. allow use of a magnetometer	2

(b) (i)

Statements	Order
the switch is closed	**1**
the lamp is on	**(6)**
the armature is attracted	**3**
the contacts are pushed together	**5**
the electromagnet is magnetised	**2**
the armature rotates	**4**

all five numbers in correct positions = 3 marks;;;
three-four numbers in correct positions = 2 marks only;;
one-two numbers in correct positions = 1 mark only;

3

(ii)

idea that electromagnet loses its magnetism;

AND 1 of;

- armature no longer attracted / idea that armature moves away from the magnet
- opens the contacts / breaks the **lamp** circuit

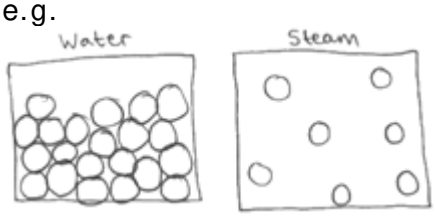
condone idea that electromagnet is not magnetic

allow iron for armature

ignore references to current not flowing

2

Total for question 2 = 10 marks

Question number	Answer	Notes	Marks
3 (a)	any 2 of: MP1. particles gain kinetic energy / KE; MP2. particles move further apart; MP3. some particles escape / evaporate from the surface / become a gas/vapour;	allow particles move faster / vibrate more allow particles break bonds	2
(b)	comment about separation; e.g. particles in steam further apart comment about location of particles; e.g. steam particles fill container but water particles have a surface e.g.  = 2 marks	ignore comments referring to motion of particles allow steam takes volume of container but water doesn't allow marks if seen on a labelled diagram or writing	2
(c)	any 3 of: MP1. (average) speed / KE of particles decreases (when cooled); MP2. particles collide less often with the can; MP3. (when cooled) pressure inside the can decreases; MP4. pressure outside greater than pressure inside the can;	allow molecules for particles throughout allow 'particles join water' / steam condenses (into water) allow particles collide with the can with less force allow pressure proportional to temperature ignore references to vacuum allow RA	3

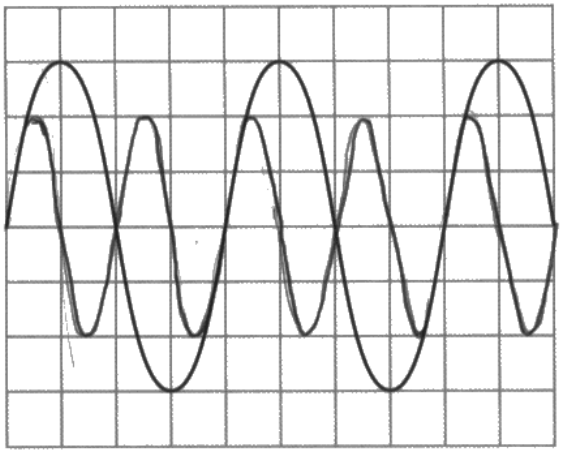
Total for question 3 = 7 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>4 (a)</td><td>one mark for each correct tick;;
if three ticks, 1 mark maximum
if four ticks, zero marks
<table><tr><th>Statement</th><th>Tick</th></tr><tr><td>negatively charged particles move from the cloth onto the balloon</td><td>✓</td></tr><tr><td>positively charged particles are rubbed off the balloon</td><td></td></tr><tr><td>negatively charged particles on the balloon are protons</td><td></td></tr><tr><td>the cloth becomes positively charged</td><td>✓</td></tr></table></td><td></td><td>2</td></tr>
<tr><td>(b) (i)</td><td>any 1 of:
(possibility of a) spark;
(possibility of an) explosion / fire / eq;</td><td>ignore references to shock

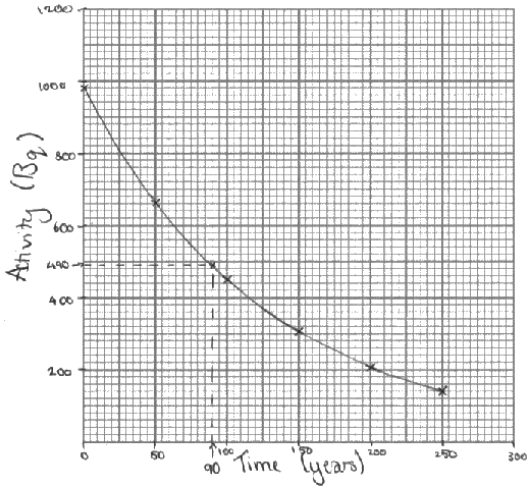
allow ‘ignite the petrol’</td><td>1</td></tr>
<tr><td>(ii)</td><td>earthing / grounding the {tank / pipe} ;</td><td>allow hose for pipe
allow can for tank
allow description of earthing e.g. ‘connecting tank/pipe to ground (with a wire)’</td><td>1</td></tr>
<tr><td>(c)</td><td>(granules) repel;

(because) charge on the granules is all the same / eq;</td><td>ignore references to attraction to container</td><td>2</td></tr>
</table>

Total for question 4 = 6 marks

Question number	Answer	Notes	Marks
5 (a)	20 (Hz) to 20 000 (Hz);;	one mark for each end of the range correct allow 20 kHz for 20 000 Hz	2
(b) (i)	microphone;		1
(ii)	any 3 of: MP1. adjust the oscilloscope to get a steady trace / eq; MP2. adjust time base / oscilloscope to give a minimum of 1 complete cycle (on the screen); MP3. measure number of squares for a number of complete cycles / waves; MP4. multiply number of squares by the time base / eq. (to find T); MP5. use f = 1/T;	ignore references to wavelength, amplitude, finding number of waves passing a point allow 'measure/find the time period / time for one wave' if neither MP3 or MP4 scored	3
(iii)	amplitude smaller throughout; <u>double</u> the original frequency throughout; 	ignore vertical position of waveform	2

Total for question 5 = 8 marks

Question number	Answer	Notes	Marks
6 (a) (i)	suitable linear scale chosen (>50% of grid used); axes labelled with quantities and units; plotting correct to nearest half square;;	orientation needs to be correct -1 for each mistake to a maximum of -2	4
(ii)	line (curve) of best fit acceptable;  Time in years: 0, 50, 100, 150, 200, 250 Activity in Bq: 980, 660, 450, 305, 205, 140	allow ECF from plotting i.e. smooth curve with points evenly distributed about it	1
(iii)	appropriate working shown on graph or numerically; 90 years;	allow ECF from graph answer within range of 85-95 (years) gets 2 marks	2
(b) (i)	(0.56 X 2.7 =) 1.5 (W);	allow 1.51, 1.512	1
(ii)	idea that alpha has short range / low penetrating power; and 1 of; • alpha absorbed by the case • alpha does not reach the skin	ignore 'alpha is weak' ignore 'alpha can't penetrate paper' allow 'cannot penetrate the case' allow 'cannot penetrate the skin'	2
(c)	longer half-life means plutonium decays more slowly; idea that it generates electricity / power for longer;	accept RA allow idea that **energy** does not 'run out'	2

Total for question 6 = 12 marks

Question number	Answer	Notes	Marks
7 (a) (i)	momentum = mass x velocity;	in words or accepted symbols e.g. p = m x v	1
(ii)	substitution; evaluation; unit; e.g. (p =) 0.000 035 x 8.8 (p =) 0.00031 kg m/s	-1 for power of ten (POT) error kg m/s or Ns 3.08×10^{-4}, 0.000308 N s allow 0.308 g m/s for 3 marks	3
(b) (i)	gravitational (potential) energy = mass x g x height;	allow in standard symbols or in words e.g. GPE = m x g x h reject 'gravity' for g	1
(ii)	substitution; evaluation; e.g. (GPE =) 0.000 035 x 10 x 1200 (GPE =) 0.42 (J)	allow use of g= 9.8 / 9.81 420 (J) gets 1 mark max. allow 0.4116, 0.41202	2
(iii)	same answer as (b)(ii);	allow 0.42 (J)	1
(c) (i)	KE = ½ x m x v^2;	allow in accepted symbols or words	1
(ii)	substitution; rearrangement; evaluation; e.g. $0.42 = \frac{0.000\,035 \times v^2}{2}$ $v^2 = 24000$ (v =) 155 (m/s)	ECF from (b)(iii) answer must be seen to at least 3 s.f. award 2 marks max. for reverse calculation of KE = 0.394 (J) 154.919...	3
(iii)	any 2 of: MP1. (raindrop reaches) terminal velocity; MP2. drag / air resistance / friction acts; MP3. energy lost to surroundings / eq.; MP4. (resultant) downwards force is less;	 ignore unqualified "it loses energy" allow 'acceleration is less'	2

Total for question 7 = 14 marks