GCSE Physics Mock Test 1
Max Marks : 120
Max Time Allowed: 2 Hours

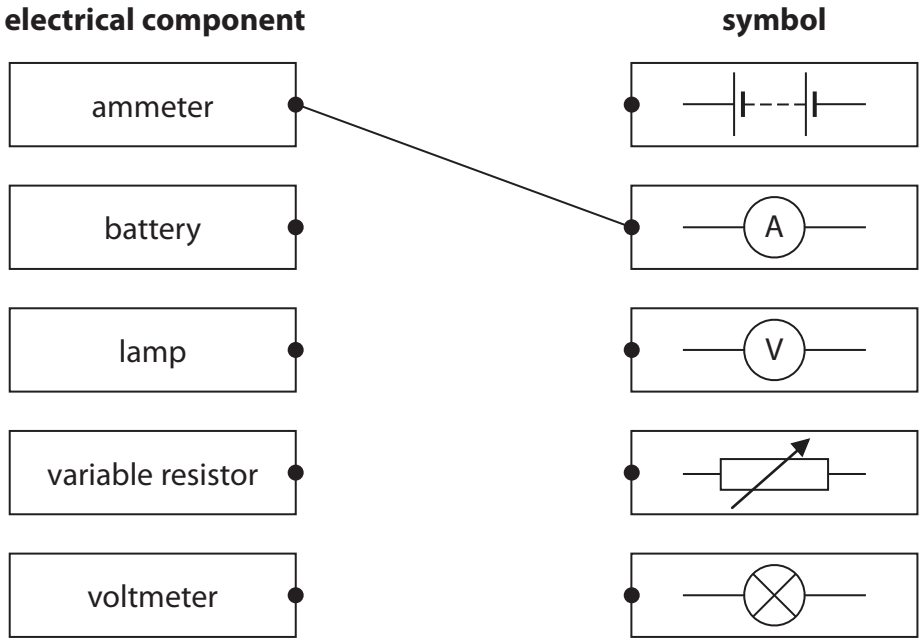
Answer ALL questions.

1 This question is about electrical components.

(a) Draw a straight line from each electrical component to its correct symbol.

One has been done for you.

(3)



(b) (i) Name an electrical component whose resistance decreases when it is moved into brighter light.

(1)

.....

(ii) Name an electrical component whose resistance decreases as its temperature increases.

(1)

.....

(Total for Question 1 = 5 marks)

2 (a) These sentences are about astronomy.

Complete the sentences by writing words in the blank spaces.

(4)

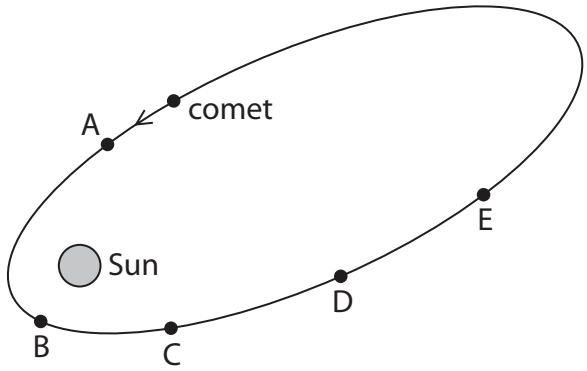
The Earth is an astronomical object.

One astronomical object smaller than the Earth is ..... .

Two astronomical objects larger than the Earth are ..... and ..... .

The Milky Way is the name given to our..... .

(b) The diagram shows the path followed by a comet as it moves around the Sun.
A, B, C, D and E are points on the comet's orbit.



(i) State the name of the force that causes the comet to orbit the Sun.

(1)

.....

(ii) At which of the points shown is the force on the comet greatest?

(1)

.....

(iii) Draw an arrow at point D to show the direction of the force acting on the comet.

(1)

(iv) At which of the points shown does the comet have the greatest kinetic energy?

(1)

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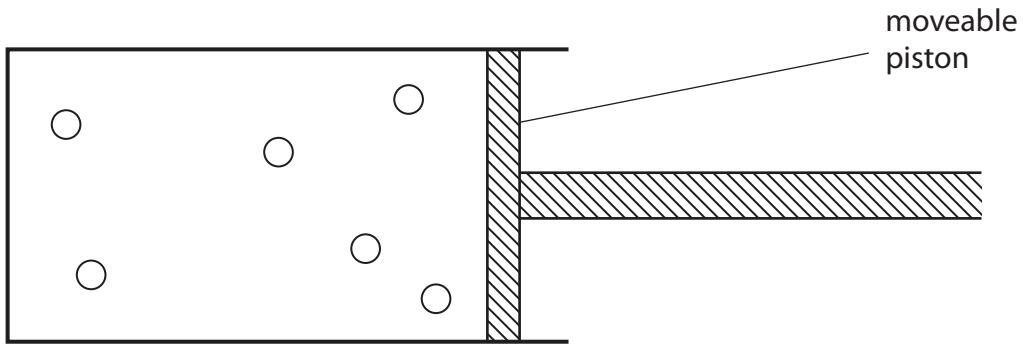
(Total for Question 2 = 8 marks)

3 The diagram shows some gas particles in a container.

The piston can be moved in or out to change the volume of the gas.



(a) Add arrows to the diagram to show the random motion of the gas particles.

(2)

(b) Explain how the motion of the gas particles produces a pressure inside the container.

(3)

(c) State what would happen to the pressure if you pushed the piston into the container without changing the temperature.

(1)

(d) When the gas in the container is heated, the piston moves outwards.

Place ticks (✓) against the **three** correct statements.

(3)

Statement	Tick (✓)
the gas particles get bigger	
the mass of the gas particles stays the same	
the gas particles move faster	
the average distance between the gas particles increases	
the temperature of the gas decreases	

(Total for Question 3 = 9 marks)

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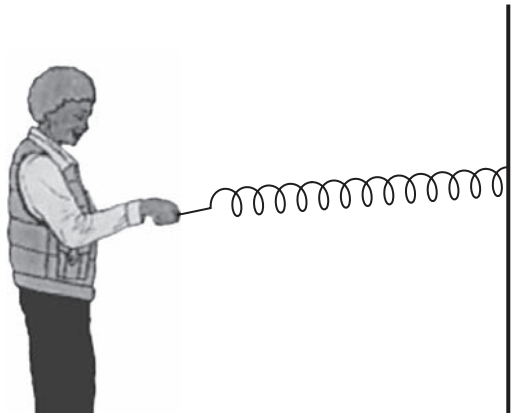
4 A teacher demonstrates different types of wave.

(a) He uses a spring to demonstrate longitudinal waves.



(i) Draw arrows on the diagram to show the directions in which the teacher moves his hand.

(1)

(ii) Give an example of a longitudinal wave.

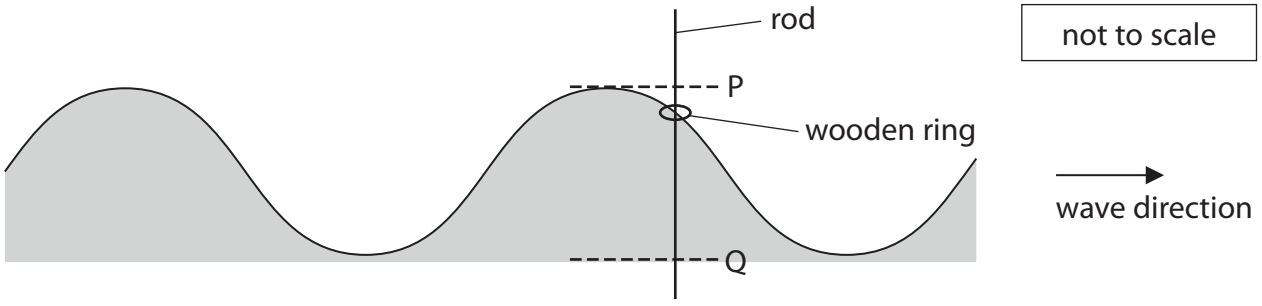
(1)

(b) The teacher then demonstrates transverse waves.

He fixes a vertical rod in a pond.

He places a small wooden ring on the rod.

The ring floats on the water and moves up and down the rod as waves go past.



(i) On the diagram, draw a line to show one wavelength.

Label your line with the letter W.

(1)

(ii) The distance from P to Q is 5.0 cm.

Determine the amplitude of the wave.

(1)

amplitude = ... cm

(iii) The wooden ring reaches point P every 15 s.

Calculate the frequency of the wave.

Give the unit.

(3)

frequency = ... unit .....

(iv) Explain how the movement of the wooden ring demonstrates that this wave is transverse.

(2)

.....

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(v) The wave shown is a water wave.

Give a different example of a transverse wave.

(1)

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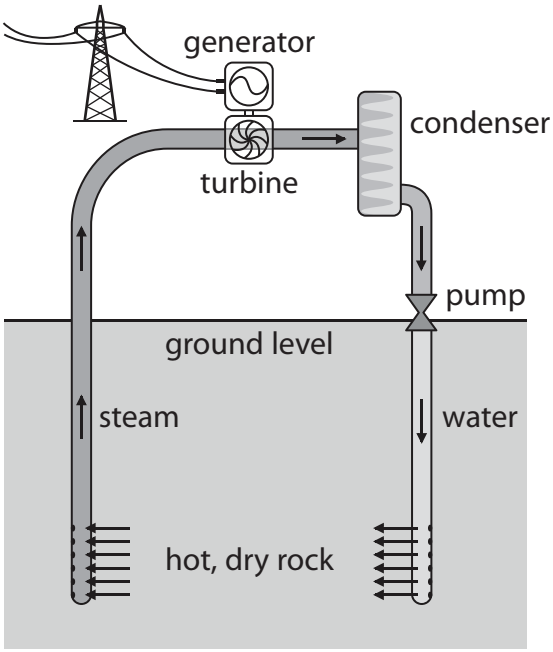
(Total for Question 4 = 10 marks)

5 The diagram shows a type of power station used to generate electricity.



(a) (i) What type of renewable resource does this power station use?

(1)

.....

(ii) Name another renewable resource.

(1)

.....

(b) Cold water is pumped down into the hot, dry rock.

Describe the energy transfers at each stage of electricity generation from this resource.

(4)

(Total for Question 5 = 6 marks)

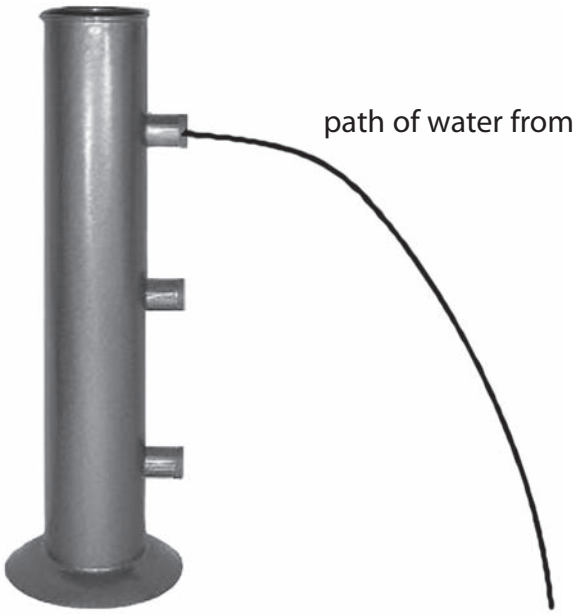
6 This question is about pressure in a liquid.

(a) A teacher uses this apparatus to demonstrate pressure difference in water.

The apparatus is hollow and has three short tubes at different depths.

The teacher completely fills the apparatus with water.

Water comes out of all the tubes.



(i) State the relationship between pressure difference, height, density and *g*.

(1)

(ii) The diagram shows the path of water coming from the top tube.

Complete the diagram by drawing the paths of water you would expect to see from the other two tubes.

(2)

(iii) Explain the pattern of the paths of water from the tubes.

(2)

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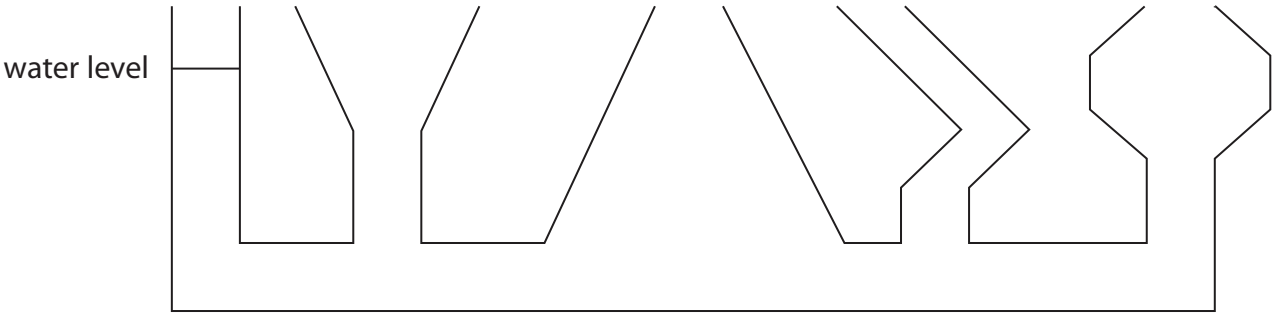
(b) In another demonstration, the teacher uses this container.

The container is made of glass and each section has a different shape.

The teacher pours water into the container until it reaches the level shown in the left-hand section.



(i) Complete the diagram by drawing the water levels in the other four sections.

(1)

(ii) Explain why the water fills the container in the way you have shown.

(2)

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(Total for Question 6 = 8 marks)

7 A student uses a semicircular glass block to investigate refraction in glass.

(a) List three other pieces of equipment that he needs for this investigation.

(3)

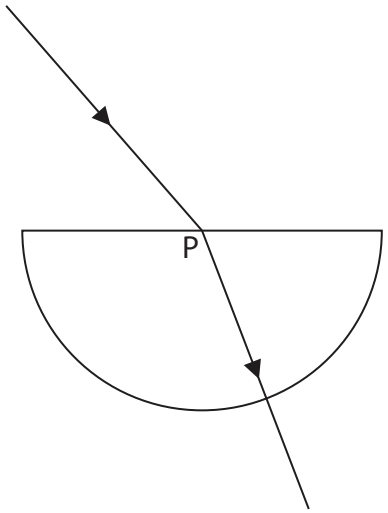
1 .....

2 .....

3 .....

(b) He shines a ray of light into the block at point P, as shown.

P is the middle of the flat surface.



(i) On the diagram, draw the normal at P.

(1)

(ii) Measure the angle of incidence and the angle of refraction.

(2)

angle of incidence .....

angle of refraction .....

(iii) Explain why the ray of light changes direction at P.

(2)

.....

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.....

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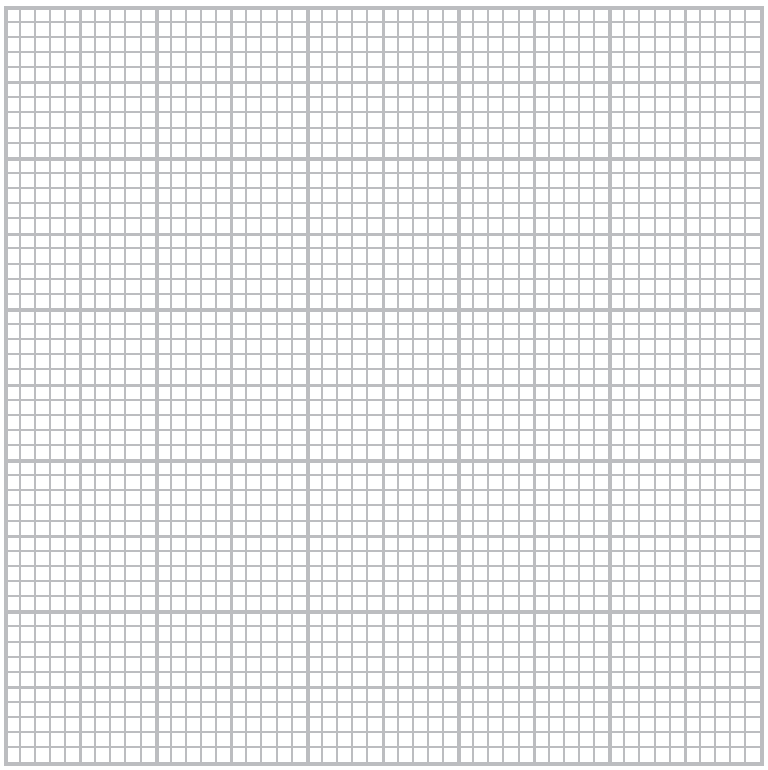
(c) The student varies the angle of incidence and obtains this table of results.

Angle of incidence *i*	Angle of refraction *r*	sin *i*	sin *r*
11°	7°	0.19	0.12
24°	15°	0.41	0.26
47°	28°	0.73	0.47
65°	36°	0.91	0.59
90°	40°	1.00	0.64

(i) Plot a graph of sin *i* against sin *r*.

(4)



(ii) Draw the straight line of best fit.

(1)

(iii) State the relationship between refractive index, angle of incidence and angle of refraction.

(1)

(iv) Use your graph to find the refractive index of glass.

(2)

refractive index = ...

(Total for Question 7 = 16 marks)

8 The table shows information about three electrical appliances.

Appliance	Power in W	Current in A
lamp	40	0.17
clothes iron	2200	9.6
television	110	

(a) (i) State the relationship between power, current and voltage.

(1)

(ii) Calculate the current in the television.
[assume that the mains voltage is 230 V]

(2)

current = ... A

(b) The photographs show the different cables used for the clothes iron and the lamp.

clothes iron cable

lamp cable

(i) Suggest why the wires in the clothes iron cable are thicker than the wires in the lamp cable.

(1)

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.....

(ii) The clothes iron cable has three wires, E, N and L.

Which of these wires is connected to the fuse?

(1)

.....

(iii) Suggest why the lamp is safe to use, even though its cable only has two wires.

(1)

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(c) The lamp is switched on for 55 minutes.

Calculate the energy transferred by the lamp in this time.

(3)

energy transferred = ... J

(Total for Question 8 = 9 marks)

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9 Tritium is an isotope of hydrogen that decays by emitting beta particles.

It is used in some luminous signs.

(a) (i) The symbol for tritium is $^{3}_{1}H$.

Determine the number of protons and the number of neutrons in a single atom of tritium.

(2)

number of protons .....

number of neutrons .....

(ii) Describe three differences between an alpha particle and a beta particle.

(3)

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(iii) Suggest why tritium cannot emit alpha particles.

(1)

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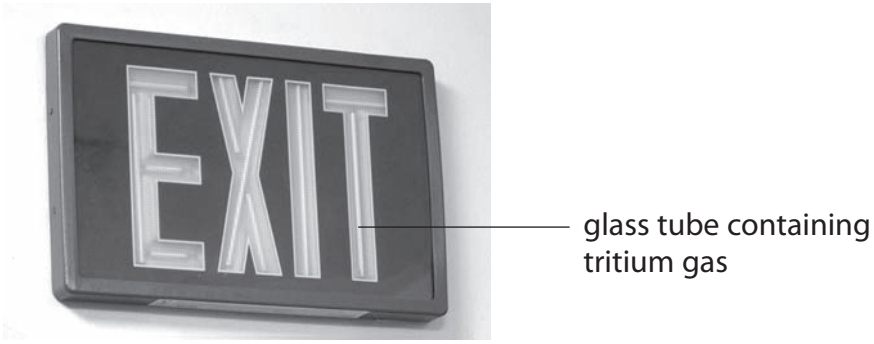
(b) Tritium is used in this luminous sign.



In this sign

- the letters are made up of glass tubes containing tritium gas
- the inside of each tube is coated with a phosphor
- the phosphor emits light when beta particles hit it

Suggest why this sign is safe to use even though beta particles are ionising and can be dangerous.

(2)

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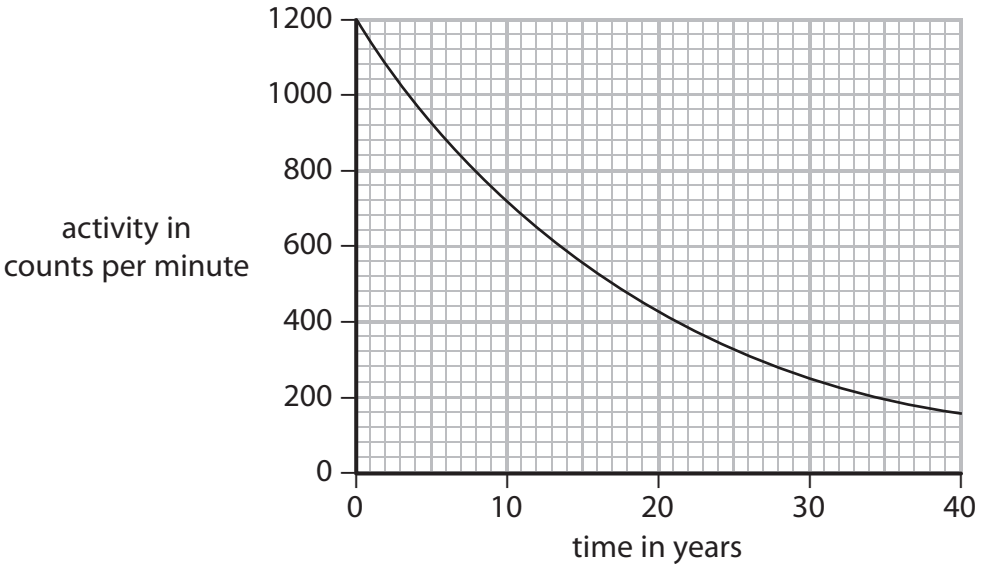
(c) The graph shows how the activity of tritium in this luminous sign varies with time.



(i) Explain what is meant by the term **half-life**.

(2)

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(ii) Use the graph to estimate the half-life of tritium.

Show your working.

(2)

half-life = ... years

(d) The manufacturer of this luminous sign claims that the sign will work for more than 20 years.

The minimum activity required for the tubes to emit sufficient light is 400 counts per minute.

Evaluate the manufacturer's claim.

(2)

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(Total for Question 9 = 14 marks)

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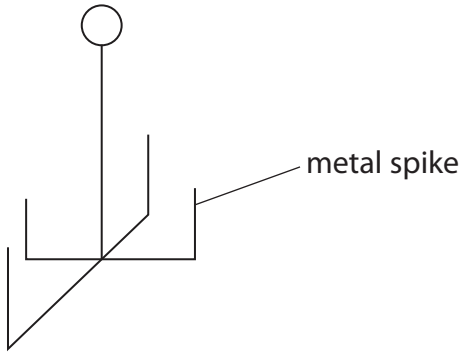
10 The diagram shows a metal device for cooking potatoes.

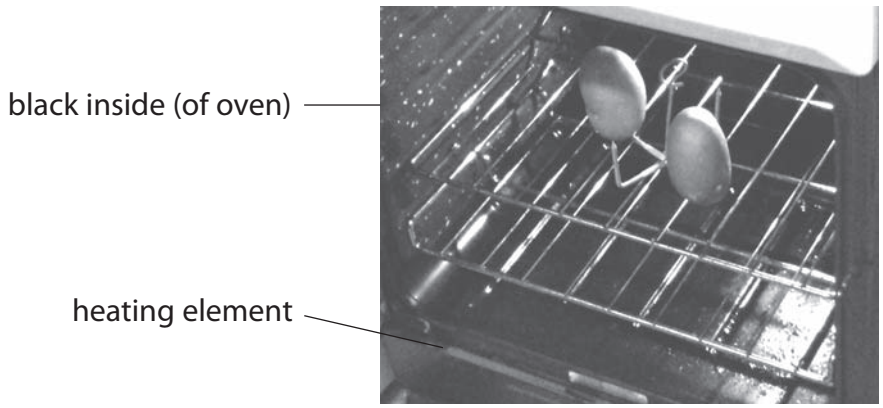
Potatoes are pushed onto the metal spikes.



The photograph shows two potatoes cooking in an electric oven.

The inside of the oven is black.

The heating element is at the bottom of the oven.



Describe the different ways in which energy is transferred to cook the potatoes.

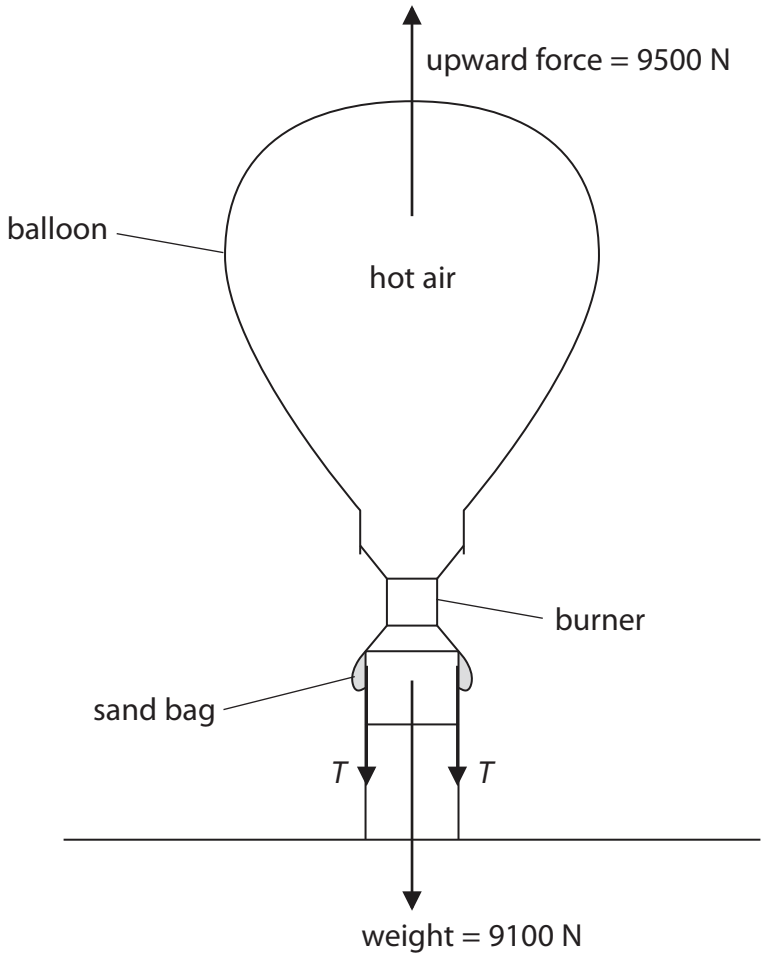
(6)

(Total for Question 10 = 6 marks)

11 A hot-air balloon is tied to the ground by two ropes.

The diagram shows the forces acting on the balloon.

The tension *T* in each rope is 200 N.



The ropes are untied and the balloon starts to move upwards.

(a) State the value of the force acting downwards on the balloon immediately after the ropes are untied and before the balloon starts moving.

(1)

force downwards = ... N

(b) (i) State the relationship between unbalanced force, mass and acceleration.

(1)

(ii) The balloon has a total mass of 910 kg.

The initial unbalanced force on the balloon is 400 N upwards.

Calculate the initial acceleration.

(2)

initial acceleration = ... m/s^2

(c) Explain how the upward acceleration of the balloon changes during the first few seconds of its flight.

(3)

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(d) While the balloon is still accelerating, the pilot controls the balloon by pouring some sand from the bags.

Explain how this affects the upward acceleration of the balloon.

(2)

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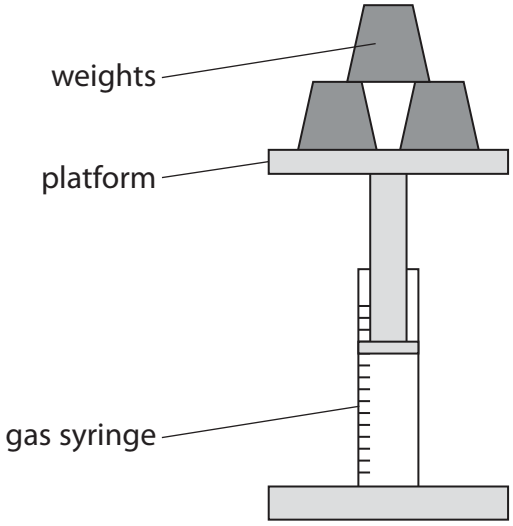
(Total for Question 11 = 9 marks)

12 A student uses this apparatus to investigate the pressure and volume inside a sealed gas syringe.



She takes readings of the volume as she increases the pressure (loading) and as she decreases the pressure (unloading).

These are her results.

Pressure in kPa	Volume of gas in cm^3		
	loading	unloading	average (mean)
100	50	50	50
90	56	55	55.5
84	60	60	60
55	90		92
60	85	83	84
50	101	101	101

(a) (i) Complete the table by filling in the missing value.

(1)

(ii) Suggest why the student takes readings for increasing the pressure and for decreasing the pressure.

(2)

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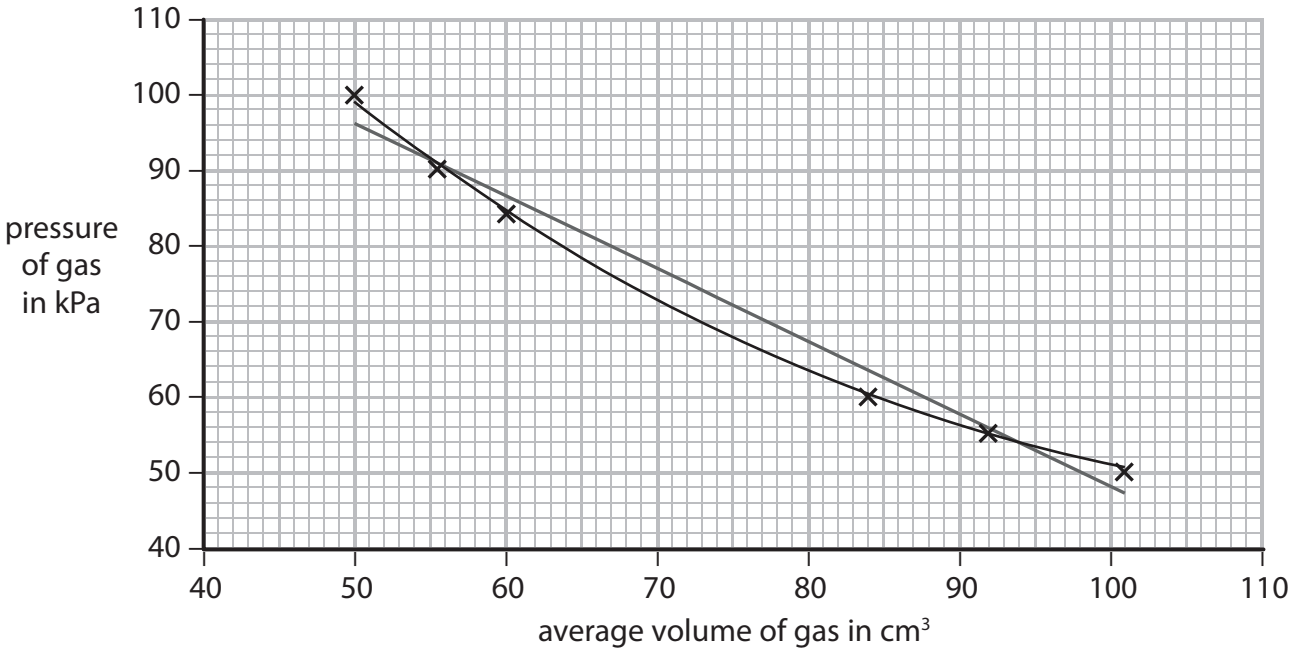
(b) The student plots this graph.



(i) Suggest a reason why the axes do not start from the origin (0,0).

(1)

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(ii) The student has drawn both a straight line of best fit and a curve of best fit.

Discuss which line is correct for this investigation.

(2)

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(iii) Suggest a way that the student could make this experiment valid (a fair test).

(1)

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(iv) Suggest two ways in which the student could improve the quality of her data.

(2)

1 .....

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2 .....

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(c) The student concludes that her data validates the relationship between pressure and volume of a fixed mass of gas.

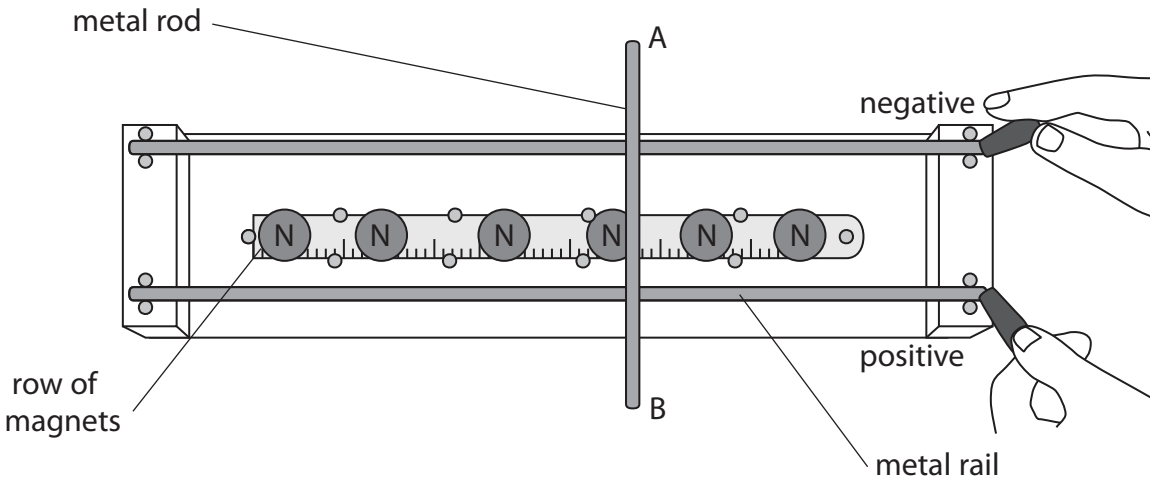
Use data from this table to evaluate her conclusion.

(3)

Pressure in kPa	Average volume in cm^3	Space for calculations
100	50	
90	55.5	
84	60	
55	92	
60	84	
50	101	

(Total for Question 12 = 12 marks)

13 (a) A student uses this apparatus to investigate what happens to a current-carrying conductor in a magnetic field.



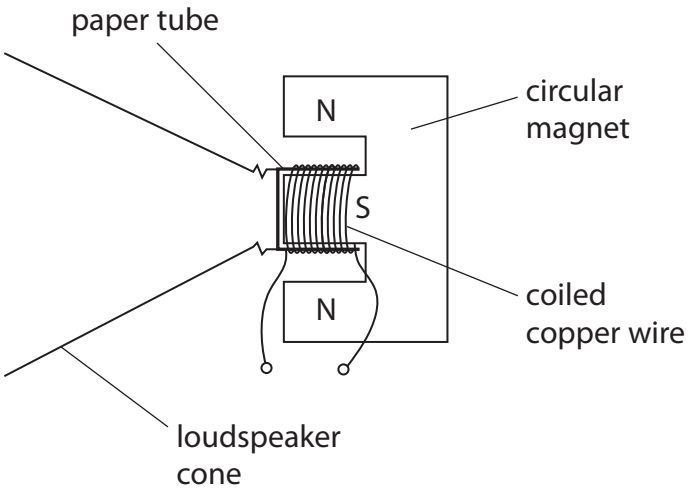
The student connects the two parallel horizontal metal rails to the positive and negative terminals of a power supply.

The metal rod AB rests across the rails and is free to move.

Explain what happens to the metal rod AB.

(4)

(b) This diagram shows the construction of a simple loudspeaker.



A coil of wire is wrapped around a paper tube attached to the loudspeaker cone.

When there is an alternating current in the coil, the cone moves.

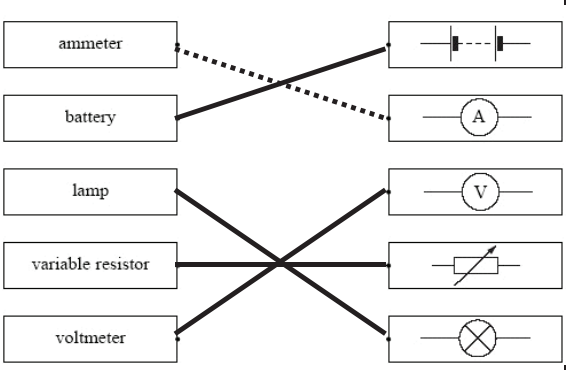
Describe how the alternating current generates a sound wave.

You may draw a diagram if it helps your answer.

(4)

(Total for Question 13 = 8 marks)

TOTAL FOR PAPER = 120 MARKS

Question number	Answer	Notes	Marks
1 (a)	 all 4 lines;;; any 2 lines;; any one line;	(dotted line is given)	3
(b) (i)	light dependent resistor / LDR;	allow • photo sensitive resistor • light sensitive resistor allow recognisable spellings	1
(ii)	thermistor;	allow recognisable spellings total marks = 5	1

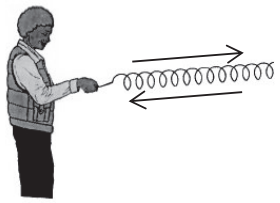
Question number	Answer	Notes	Marks
2 (a)	any suitable from: e.g. • asteroid; • meteor(ite); • (artificial) satellite; • a moon; • comet; • named planet; • dwarf planet e.g. Pluto; • neutron star; • white dwarf; any two suitable from: • (the) Universe; • galaxy; • solar system; • star / Sun; • named planet (1); • named planet (2); galaxy;	accept appropriate correct answers planets: • Mercury • Venus • Mars 'Sun and star' is 1 mark only planets should be gas giants: • Jupiter • Saturn • Uranus • Neptune	4
(b) (i)	gravitational force / gravitational pull / (force of) gravity;		1
(ii)	B;		1
(iii)	single straight arrow directed towards the Sun;	judge by eye	1
(iv)	B;	total marks = 8	1

Question number	Answer	Notes	Marks
3 (a)	minimum of three straight arrows for different particles (with different lengths); arrows in different directions;	judge by eye arrows need not be attached to particles but it should be clear which particle they refer to	2
(b)	any three from: MP1. particles collide/impact/eq; MP2. with sides/walls of container; MP3. idea that force is produced; MP4. idea of pressure as force on an area;	allow hit for collide allow particle changes momentum p = F/A	3
(c)	idea that pressure increases/eq;		1
(d)			3

Statement	Tick (☐)
the gas particles get bigger	
the mass of gas particles stays the same	✓
the gas particles move faster	✓
the average distance between gas particles increases	✓
the temperature of the gas decreases	

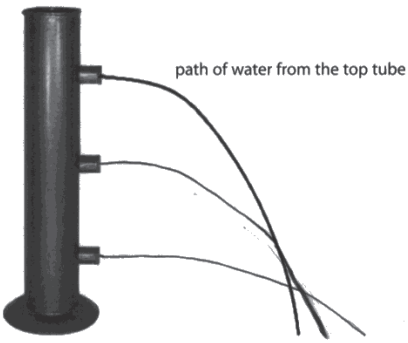
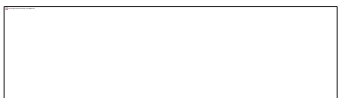
one mark for each correct;;;
if 4 ticks then max mark is 2
if 5 ticks then zero marks

total marks = 9

Question number	Answer	Notes	Marks
4 (a) (i)	arrows in opposite directions and (roughly) parallel with the length of the spring; 	allow • a line with a double head • arrows to R & L ignore arrow length arrows need not be adjacent to the spring judge by eye	1
(ii)	any suitable example; e.g. sound ultrasound 'p' wave	ignore waves in a slinky	1
(b) (i)	suitable horizontal line (labelled W); e.g. from peak to peak from trough to trough from midpoint to corresponding midpoint between any adjacent points in phase	judge by eye but should start and finish at suitable points	1
(ii)	2.5 (cm)	do not allow 5/2 allow 2 ½	1
(iii)	substitution into f=1/T; evaluation; unit; e.g. f=1/15 0.067 Hz	no mark for equation as it is given on page 2 -1 for POT error ignore answers given as fractions allow 0.07, 0.0667 s^{-1} condone incorrect truncation e.g. 0.06, 0.066, 0.0666	3

(iv)	(ring oscillates) perpendicular / at right angles}; to the direction the wave travels/eq;	allow direction of energy transfer reject 2nd mark if reference to longitudinal wave e.g. 'ring moves parallel to the direction of the wave'	2
(v)	any suitable example; e.g. a named EM wave EM wave 's' wave	allow wave on a rope total marks = 10	1

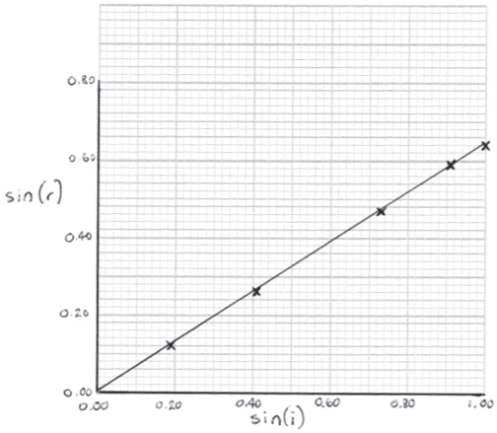
Question number	Answer	Notes	Marks
5 (a) (i)	geothermal / geothermic;	allow nuclear	1
(ii)	any suitable resource or method; e.g. • wind (turbine) • hydro-electric • waves • tidal • solar (panels) • biofuels/biomass	ignore nuclear ignore unqualified 'water' allow photovoltaic cells, (sun)light allow wood	1
(b)	any four from: MP1. thermal energy is transferred from hot rock to cold water OR water heats up; MP2. water molecules gain KE (as they are heated); MP3. steam gains KE as it is heated by the rock; MP4. GPE of steam increases as it gains height; MP5. turbine gains KE from hot water/steam; MP6. generator (coils) transfer KE (from turbine) into electrical energy; MP7. electrical energy is transferred from pump into GPE/KE of water;	allow 'mechanical energy' for KE throughout allow 'heat' for thermal energy allow water turned into steam allow turbine transfers KE to electrical energy total marks = 6	4

Question number	Answer	Notes	Marks
6 (a) (i)	pressure difference = $\rho \times g \times h$	accept in words or rearranged form allow 'd' for density do not accept 'gravity' must be 'g' or gravitational field strength	1
(ii)	both are curves; lowest curve travels further than top curve (if extrapolated);  		2
(iii)	MP1. water at bottom has greater pressure / pressure increases with depth; MP2. (therefore) force on water at the bottom is greatest;	allow idea that there is more weight above a point, the lower the point is allow water leaves lower holes with greater speed	2
(b) (i)	water level is constant in each vessel; 	ignore lines drawn in gaps between vessels	1
(ii)	any two from: MP1. vessels are connected; MP2. same density / type of liquid in all; MP3. air pressure is the same for all; MP4. pressure only depends on the depth;	allow water flows to other vessels allow pressure does not depend on (surface) area total marks = 8	2

Question number	Answer	Notes	Marks
7 (a)	any three from: paper / pen / pencil; protractor; ruler / straight edge; light source (& power supply); (optical) pins;	 allow cork board ignore unqualified 'light' allow needles	3
(b) (i)	line drawn at P at 90° to the flat surface;	judge by eye	1
(ii)	41(°); 21(°);	tolerance +/- 3° no ECF	2
(iii)	change of medium / eq; change in speed / wavelength;	allow change of refractive index / (optical) density ignore changes direction reject second mark if contradiction seen	2

<table>
<tr><td>(c) (i)</td><td>label on both axes;

scale on both axes;

plotting;;
 
</td><td>ignore orientation
ignore any units
linear scale using ≥50% of the grid
tolerance is +/- 0.5 square
-1 for each error

<table><tr><th>sin i</th><th>sin r</th></tr><tr><td>0.19</td><td>0.12</td></tr><tr><td>0.41</td><td>0.26</td></tr><tr><td>0.73</td><td>0.47</td></tr><tr><td>0.91</td><td>0.59</td></tr><tr><td>1.00</td><td>0.64</td></tr></table></td><td>4</td></tr>
<tr><td>(ii)</td><td>straight line of best fit (towards zero);</td><td>points should be evenly distributed about the line</td><td>1</td></tr>
<tr><td>(iii)</td><td>n = sin i ÷ sin r</td><td>accept sine for sin</td><td>1</td></tr>
<tr><td>(iv)</td><td>correct use of data from graph or table seen;
value in range 1.54-1.60;</td><td>total marks = 16</td><td>2</td></tr>
</table>

Question number	Answer	Notes	Marks
8 (a) (i)	P = I x V;	accept standard symbols or in words or rearranged	1
(ii)	substitution and rearrangement; evaluation; e.g. (I =) 110/230 (I =) 0.48 (A)	 allow 0.5, 0.47826 (A) condone 0.47, 0.4782	2
(b) (i)	any suitable suggestion; e.g. carries a high(er) <u>current</u> has low(er) <u>resistance</u>	ignore references to cable overheating/melting	1
(ii)	L or live;		1
(iii)	any suitable suggestion; e.g. double insulated does not have a metal case / has a plastic case	 case is not a conductor / is an insulator	1
(c)	substitution into a suitable equation; time in correct units; evaluation; e.g. (E = I x V x t) (E =) 0.17 x 230 x 55……1 mark (E =) 0.17 x 230 x 55 x 60…2 marks (E =) 130 000 (J)……3 marks OR (E = P x t) (E =) 40 x 55……1 mark (E =) 40 x 55 x 60……2 marks (E =) 130 000 (J)……3 marks	no mark for the equation as given in the paper allow if x60 / 3300 seen anywhere in working 129 030 (J) allow 131 835 for use of V = 235V 132 000(J) total marks = 9	3

Question number	Answer	Notes	Marks
9 (a) (i)	number of protons = 1; number of neutrons = 2;		2
(ii)	any three of the following **comparisons**: MP1. beta particle is negatively charged <u>and</u> alpha is positively charged; MP2. beta particle has lower/less mass ORA; MP3. beta particle has 1 charge but alpha has 2 charges; MP4. beta particle is an electron but alpha is 2p + 2n /eq; MP5. beta is less ionising; MP6. beta has higher speed; MP7. beta particles have larger range; MP8. beta has higher penetrating ability;	ignore descriptions of applications of types of radiation allow 'beta is lighter' ORA allow beta can pass through paper but alpha will be stopped	3
(iii)	any sensible suggestion; e.g. • alpha is 4 nucleons, tritium has (only) 3 / eq • tritium has only 1p, 2p are in alpha • tritium has not got enough mass / mass number too low • tritium has not got enough nucleons • tritium has not got enough p / atomic number too low • tritium has not got enough p+n	ignore tritium is too small	1
(b)	any two from: MP1. energy explanation; e.g. beta particles have given up all their KE on impact MP2. absorption explanation; e.g. beta particles have hit (and been absorbed by) phosphor MP3. penetration explanation; e.g. beta cannot penetrate (thick) glass / tube MP4. range explanation; e.g. signs are further away than the range of beta	ignore: • beta particles have low ionisation /OWTTE • no gas can escape	2

Question number	Answer	Notes	Marks
9 (c) (i)	time taken; and either of • for (radio)activity to **halve**; • for **half** of (radioactive) nuclei / atoms / isotope to decay;	allow how long it takes reject 'half the time' allow count rate for activity reject: • particles • molecules • substance • 'break down' • 'reactivity' • a nucleus / an atom • halve in mass • to completely/fully decay	2
(ii)	working seen/appropriate line(s) on graph seen; 13.5 years;	 tolerance ± 0.5 years	2
(d)	MP1. correct judgment re claim; MP2. (because) EITHER correct statement re time (at which the activity is 400); OR activity (at 20 years); e.g. the manufacturer is correct because the time would be 21.5 years (to reach an activity of 400) OR the manufacturer is correct because the activity is 420 (counts per minute) (at 20 years)	 allow range of 21-22 years allow range of 410 to 440 total marks = 14	2

Question number	Answer	Notes	Marks
10	any six from: **discussion of conduction** MP1. metal spike conducts the thermal energy; MP2. thermal energy is conducted into middle of/inside the potato; **discussion of convection** MP3. convection (current) occurs; MP4. due to density of air decreasing / air expanding; MP5. potato receives hotter air near the top; **discussion of radiation** MP6. thermal energy is radiated/emitted from the black surface; MP7. potato absorbs thermal energy from all sides; **general** MP8. electrical energy is transferred into thermal energy in the heating element; total marks = 6	allow 'heat' for thermal energy throughout metal is a good conductor (of thermal energy) allow potato is heated / cooked from the inside ignore references to absorption at walls allow potato is heated / cooked from the outside	6

Question number	Answer	Notes	Marks
11 (a)	9100 (N)		1
(b) (i)	F = m x a;	accept standard symbols or in words or rearranged	1
(ii)	substitution and rearrangement; evaluation; e.g. (a =) 400/910 (a =) 0.44	-1 for POT error allow 0.4, 0.43956044 0.43 gains 1 mark only	2
(c)	any three from: MP1. speed increases; MP2. so drag {starts to act / increases}; MP3. downward forces increase; MP4. (hence) acceleration decreases;	ignore references to the initial acceleration award 1 mark for mention of terminal velocity if no other mark awarded allow air resistance / friction increases allow unbalanced force decreases	3
(d)	acceleration increases; with any one from: • weight decreases / downward force reduces; • unbalanced force increases; • mass decreases;	total marks = 9	2

Question number	Answer	Notes	Marks
12 (a) (i)	94;		1
(ii)	any two sensible suggestions: e.g. • to make results (more) reliable; • to produce an average reading; • to identify anomalous results; • because there may have been a temperature change; • because there may have been friction in the syringe;	ignore references to keeping it a fair test	2
(b) (i)	any sensible suggestion: e.g. • reduced scale gives fuller use of the grid; • because the lowest value of p or V is 50/eq; • because p or V cannot be zero;	allow RA ignore there are no values below 40	1
(ii)	idea of straight line having an even distribution of points about the line; all points seem to be on the curve;	no mark for a bald 'it's the curve' or 'it's the line' allow points are very close to the curve	2
(iii)	any sensible suggestion; e.g. • keep the temperature constant • ensure no air gets into/out of the syringe/eq • keep apparatus exactly the same • wait for same time after adding/removing loads to take the volume reading		1
(iv)	any two from: MP1. increase sensitivity/resolution of instruments; MP2. take reading(s) to fill in the middle of the graph/eq; MP3. take reading(s) to extend the range of the graph;	ignore references to parallax error / accuracy allow take readings with greater precision/eq	2

<table>
<tr>
<td>(c)</td>
<td>MP1. one correct value of p x V calculated;

MP2. second correct value of p x V calculated;

MP3. statement of agreement with Boyle's Law (within bounds of experimental error);

<table>
<tr><th>Pressure in kPa</th><th>Average volume in cm^3</th><th>Space for calculations</th></tr>
<tr><td>100</td><td>50</td><td>5000</td></tr>
<tr><td>90</td><td>55.5</td><td>4995</td></tr>
<tr><td>84</td><td>60</td><td>5040</td></tr>
<tr><td>55</td><td>92</td><td>5060</td></tr>
<tr><td>60</td><td>84</td><td>5040</td></tr>
<tr><td>50</td><td>101</td><td>5050</td></tr>
</table>
</td>
<td>allow calculation of a pressure ratio

allow calculation of a volume ratio

e.g.
• pV is a constant
• p α 1/V
• p is inversely proportional to V

total marks = 12</td>
<td>3</td>
</tr>
</table>

Question number	Answer	Notes	Marks
13 (a)	any four from: MP1. there is a current in the rod; MP2. (therefore) magnetic field around rod; MP3. magnetic fields interact / overlap; MP4. producing a force (on the rod); MP5. catapult effect / motor effect / LH rule; MP6. rod moves to the right / towards the power supply;	allow 'AB' for rod throughout allow current in the rail ignore references to cutting field lines accept the rod moves sideways / left	4
(b)	any four from: MP1. alternating current changes direction (continuously); MP2. current in coil produces alternating magnetic field/eq; MP3. (producing) force on the coil/cone; MP4. reversing direction of current reverses direction of the force; MP5. hence coil/cone vibrates; MP6. cone vibrates air particles; total marks = 8	allow any marking point if clear from diagram allow changing magnetic field allow coil / cone moves in and out / backwards and forwards	4