



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

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PHYSICAL SCIENCE

0652/01

Paper 1 Multiple Choice

October/November 2007

45 minutes

Additional Materials: Multiple Choice Answer Sheet
 Soft clean eraser
 Soft pencil (type B or HB is recommended)

* 0 6 7 9 1 1 2 8 9 5 1 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 20.

This document consists of **18** printed pages and **2** blank pages.



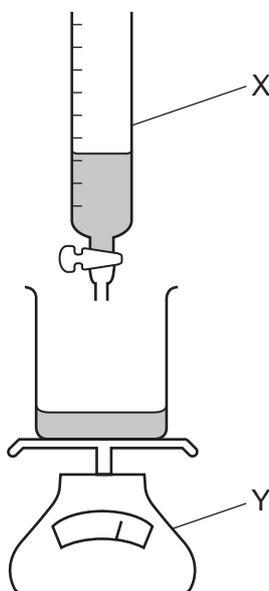
- 1 Diffusion involves the movement of particles.

For example, particles in a ...1... travel from a region of ...2... concentration to a region of ...3... concentration.

Which words are correct for 1, 2 and 3?

	1	2	3
A	gas	high	low
B	gas	low	high
C	liquid	low	high
D	solid	high	low

- 2 A student measures the mass of a volume of liquid by using the apparatus below.



What are the correct labels for X and Y?

	X	Y
A	balance	burette
B	burette	pipette
C	burette	balance
D	pipette	balance

3 Element **Z** conducts electricity and forms a basic oxide.

What could **Z** be?

	Na	Mg	S	Cl
A	✓	x	x	x
B	✓	✓	x	x
C	x	x	x	✓
D	x	x	✓	✓

4 Two isotopes of hydrogen are ${}^1_1\text{H}$ and ${}^2_1\text{H}$.

Which diagram shows the arrangement of particles in the two isotopes?

	${}^1_1\text{H}$	${}^2_1\text{H}$	key
A			⊖ = an electron
B			⊕ = a proton
C			⊖ = a neutron
D			⊖ = a nucleus

5 Which formula represents a **molecule** that contains 3 atoms?

A HBr

B MgO

C NH₃

D SCl₂

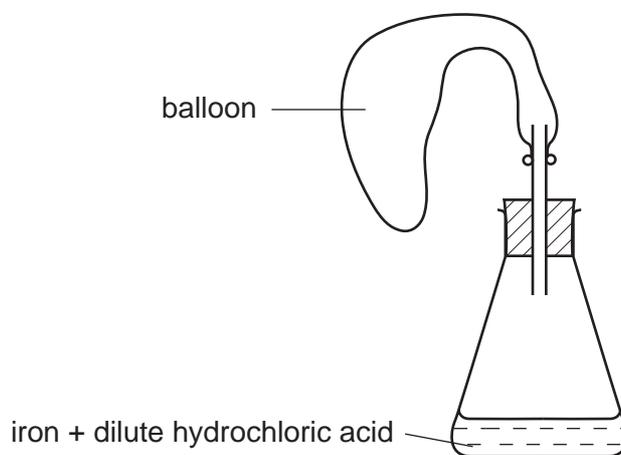
6 The production of energy is important.

Fuel ...1..., burns in an ...2... reaction.

What could 1 and 2 be?

	1	2
A	hydrogen	endothermic
B	hydrogen	exothermic
C	oxygen	endothermic
D	oxygen	exothermic

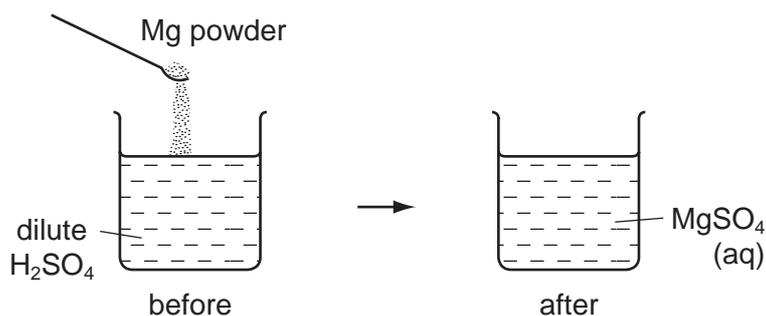
7 The diagram shows apparatus being used to fill a balloon with hydrogen.



Which form of iron makes the balloon fill most quickly?

- A** a lump
- B** pieces of wire
- C** a powder
- D** thin sheets

- 8 The diagram shows an experiment in which magnesium powder is added to dilute sulphuric acid.



Which statement correctly compares the pH and temperature of the final solution with the values of the original acid?

	final solution has	
	higher pH	higher temperature
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

- 9 Which two salts are each soluble in water?

- A** barium chloride and barium sulphate
- B** barium sulphate and silver chloride
- C** silver chloride and silver nitrate
- D** silver nitrate and barium chloride

- 10 Hydrochloric acid is used to clean metals.

The acid reacts with the oxide layer on the surface of the metal, forming a salt and water.

Which word describes the metal oxide?

- A** alloy
- B** base
- C** element
- D** indicator

15 Why is mild steel used instead of iron to make car bodies?

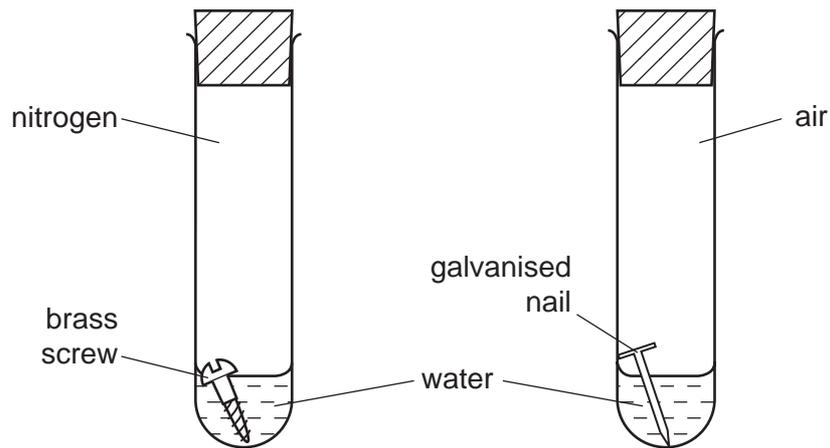
- A Iron cannot be painted.
- B Mild steel does not rust.
- C Mild steel is more brittle than iron.
- D Mild steel is stronger than iron.

16 Urea, $\text{CO}(\text{NH}_2)_2$, is used as a fertiliser.

Which element that plants need is provided by the urea?

- A carbon
- B hydrogen
- C nitrogen
- D oxygen

17 In experiments on rusting, some students are given metal objects to study.



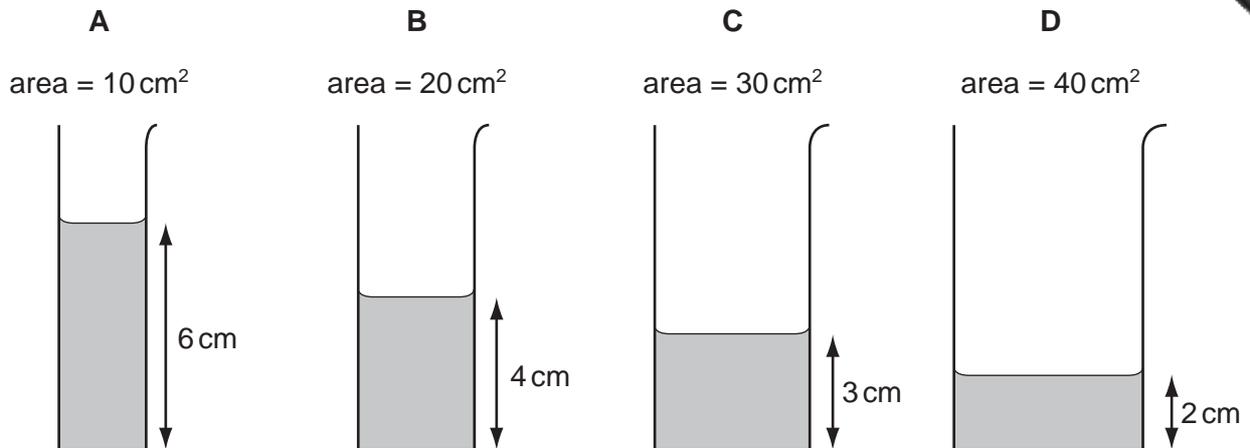
One student set up his apparatus as shown.

Which object rusted?

	brass screw	galvanized nail
A	✓	✓
B	✓	x
C	x	✓
D	x	x

21 Some water is poured into four tubes of different cross-sectional areas.

Which tube contains the largest volume of water?



22 Four students try to explain what is meant by acceleration.

Which student makes a correct statement?

- A It is related to the changing speed of an object.
- B It is the distance an object travels in one second.
- C It is the force acting on an object divided by the distance it travels in one second.
- D It is the force acting on an object when it is near to the Earth.

23 The table shows the weight of a 10 kg mass on each of five planets.

planet	weight of a 10 kg mass/N
Mercury	40
Venus	90
Earth	100
Mars	40
Jupiter	250

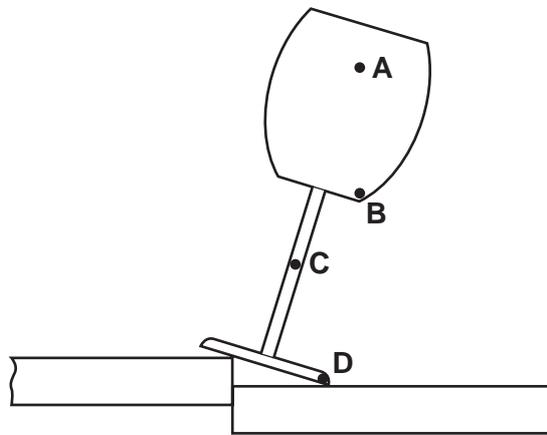
On which planets would an astronaut have a smaller weight than on Earth?

- A Mercury, Mars and Jupiter
- B Mercury, Venus and Mars
- C Mercury, Venus and Jupiter
- D Venus, Mars and Jupiter

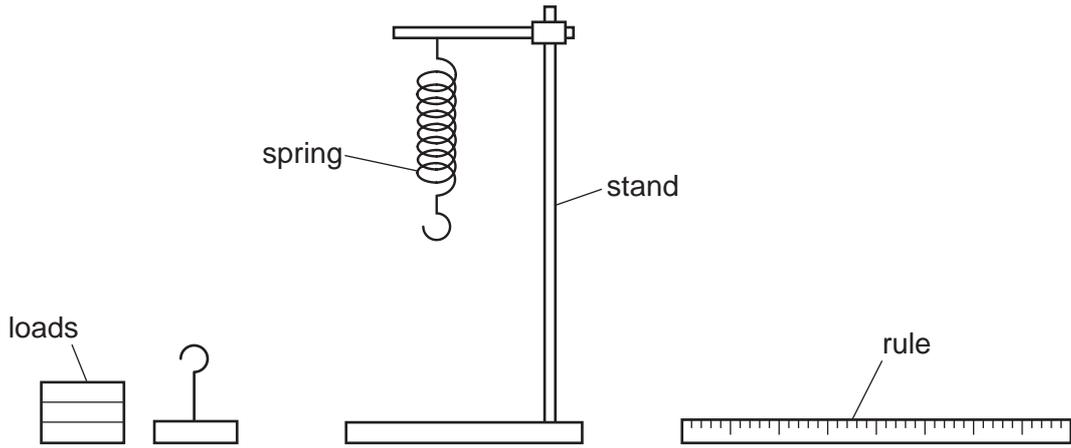
- 24 A metal drum has a mass of 200 kg when empty and 1000 kg when filled with methylated spirit.

What is the density of methylated spirit?

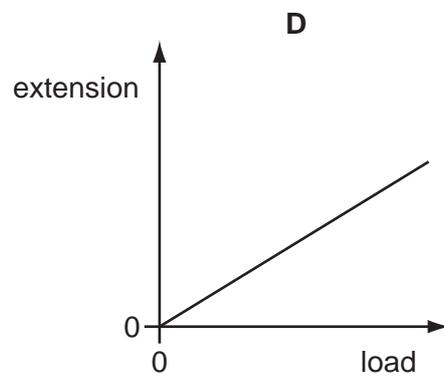
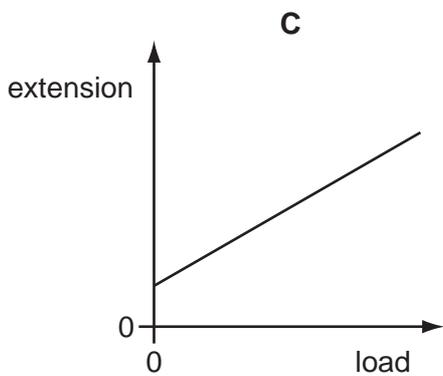
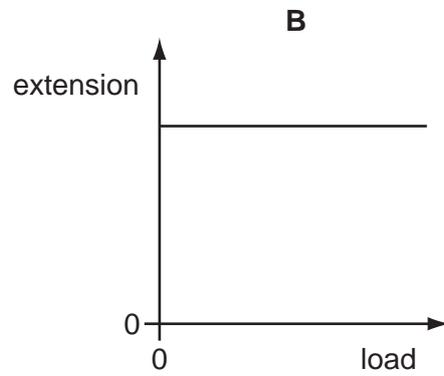
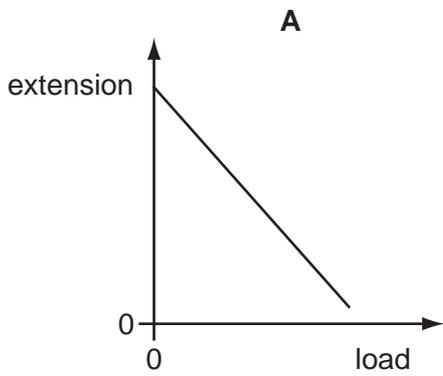
- A 0.0050 kg/m^3
B 0.11 kg/m^3
C 800 kg/m^3
D 1000 kg/m^3
- 25 An empty glass is placed on a join between two tables as shown. The glass remains stable.
- Which point is the centre of mass of the glass?



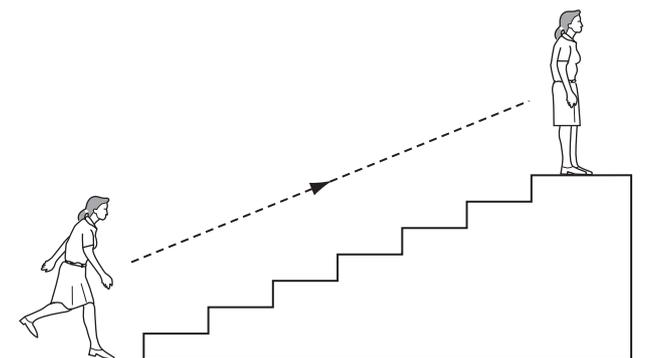
26 A spring is suspended from a stand. Loads are added and the extensions are measured.



Which graph shows the result of plotting extension against load?



27 A person uses chemical energy to run up some stairs.

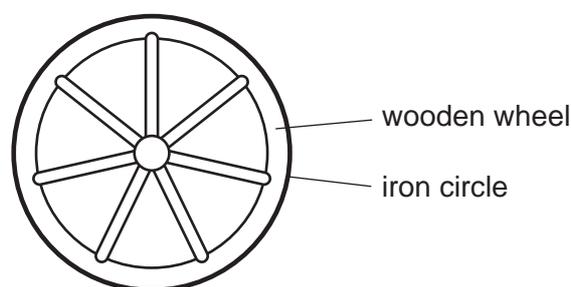


She stops at the top of the stairs.

What has the chemical energy been converted to when she is at the top of the stairs?

- A energy of motion and gravitational energy
- B energy of motion and strain energy
- C gravitational energy and heat energy
- D strain energy and heat energy

28 A wooden wheel can be strengthened by putting a tight circle of iron around it.



Which action would make it easier to fit the circle over the wood?

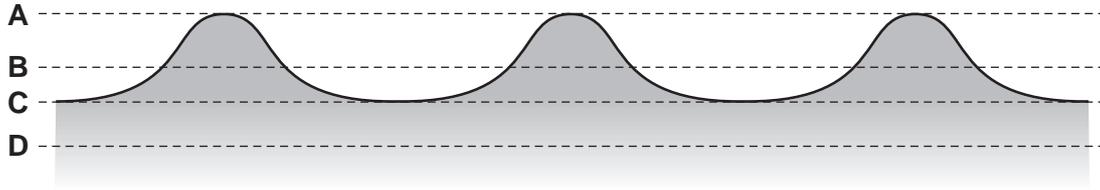
- A cooling the iron circle
- B heating the iron circle
- C heating the wooden wheel
- D heating the wooden wheel and cooling the iron circle

29 Which statement refers to convection?

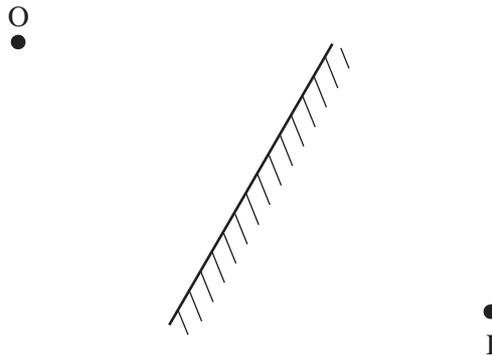
- A It does not involve energy transfer.
- B It is the transfer of heat energy without the movement of particles.
- C It only occurs in liquids or gases.
- D It only occurs in solids.

30 The diagram shows a section through a series of waves on water.

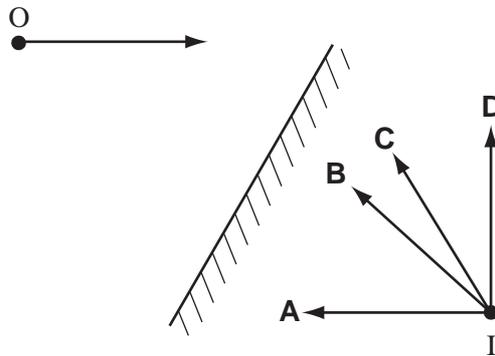
Which dotted line shows the position of the still water surface after the waves have passed?



31 An object placed in front of a plane mirror at O produces an image at I.



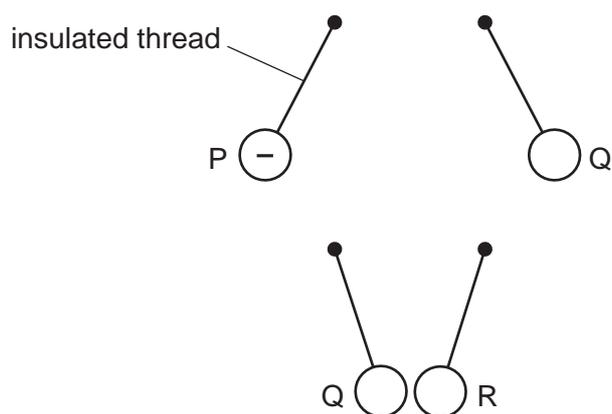
If the object moves towards the mirror in the direction shown by the arrow, in which direction does the image move?



32 Which materials are suitable for making a permanent magnet and the core of an electromagnet?

	permanent magnet	core of an electromagnet
A	iron	iron
B	iron	steel
C	steel	iron
D	steel	steel

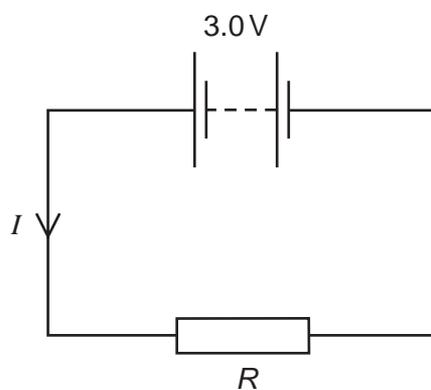
- 33 Three charged balls, P, Q and R, are suspended by insulated threads. Ball P is negatively charged.



What are the charges on Q and on R?

	Q	R
A	positive	positive
B	positive	negative
C	negative	positive
D	negative	negative

- 34 The circuit shows a current I in a resistor of resistance R .

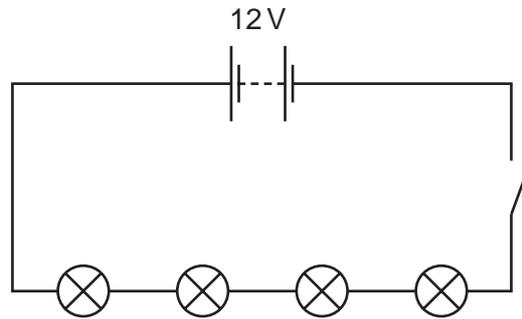


Which line gives possible values of I and R ?

	I/A	R/Ω
A	1.5	1.5
B	1.5	2.0
C	6.0	2.0
D	4.0	12

35 Four lamps are connected in a circuit as shown in the diagram.

Each lamp is designed to operate at 12 V.

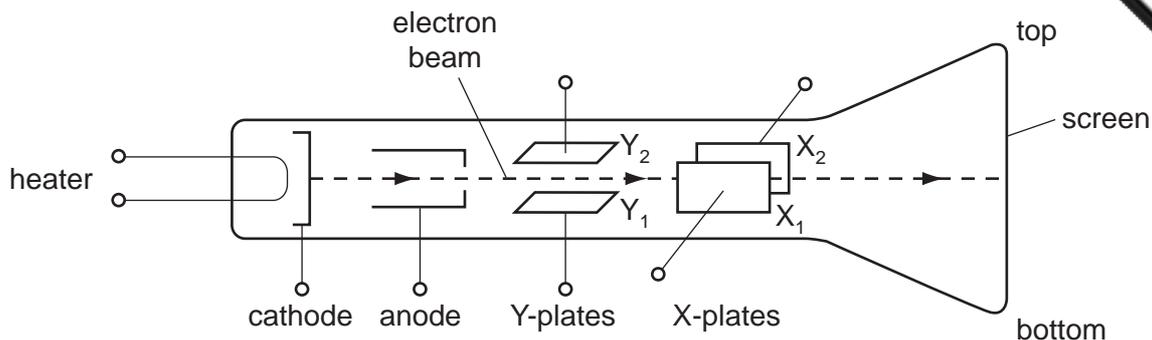


The circuit is now switched on.

Which statement is correct?

- A Each lamp can be switched off independently.
 - B If one lamp breaks all the others will stay alight.
 - C The current is the same in all the lamps.
 - D The lamps will all light at normal brightness.
- 36 A mains electrical circuit uses insulated copper cable and the cable overheats. To prevent the cable overheating, how should the cable be changed, and why?
- A Use thicker copper cable which has less resistance.
 - B Use thicker insulation which stops the heat escaping.
 - C Use thinner copper cable which has more resistance.
 - D Use thinner insulation which allows less heat to escape.

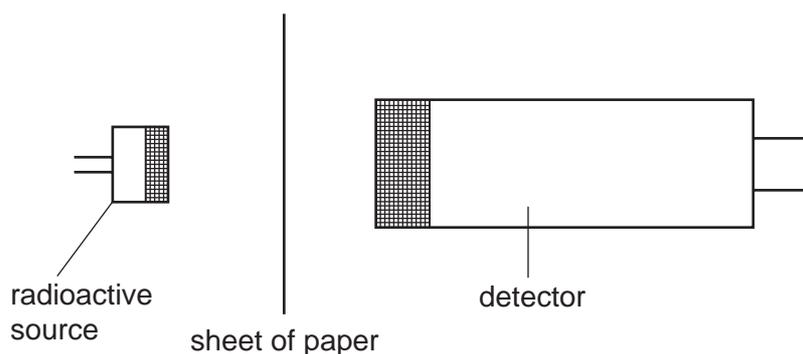
37 The diagram shows a cathode-ray tube.



What must be done to deflect the electron beam upwards?

- A make X_1 more positive than X_2
- B make X_2 more positive than X_1
- C make Y_1 more positive than Y_2
- D make Y_2 more positive than Y_1

38 A sheet of paper is placed between a radioactive source and a detector.



Which types of radiation can pass through the paper?

- A alpha-particles and beta-particles only
- B alpha-particles and gamma-rays only
- C beta-particles and gamma-rays only
- D alpha-particles, beta-particles and gamma-rays

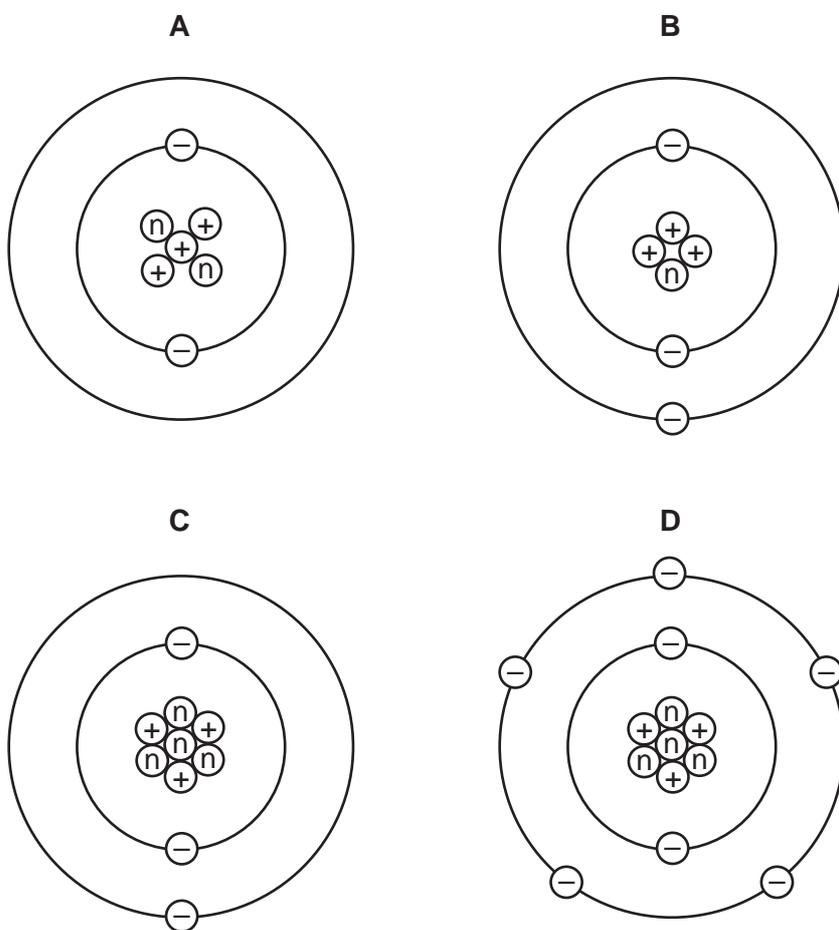
39 A sample of radioactive isotope is decaying.

The nuclei of which atoms will decay first?

- A impossible to know, because radioactive decay is random
- B impossible to know, unless the age of the material is known
- C atoms near the centre, because they are surrounded by more atoms
- D atoms near the surface, because the radiation can escape more easily

40 An atom of the element lithium has a nucleon number of 7 and a proton number of 3.

Which diagram represents a neutral atom of lithium?



key

Ⓝ = a neutron

Ⓟ = a proton

Ⓜ = an electron

(not to scale)

DATA SHEET
The Periodic Table of the Elements

		Group									
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
		1 H Hydrogen 1									
7 Li Lithium 3	9 Be Beryllium 4										
23 Na Sodium 11	24 Mg Magnesium 12	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	17 F Fluorine 9	18 Ne Neon 10				
39 K Potassium 19	40 Ca Calcium 20	13 Al Aluminium 13	14 Si Silicon 14	15 P Phosphorus 15	16 S Sulphur 16	17 Cl Chlorine 17	18 Ar Argon 18				
85 Rb Rubidium 37	88 Sr Strontium 38	27 Fe Iron 26	28 Ni Nickel 28	29 Cu Copper 29	30 Zn Zinc 30	31 Ga Gallium 31	32 Ge Germanium 32	33 As Arsenic 33	34 Se Selenium 34	35 Br Bromine 35	36 Kr Krypton 36
133 Cs Caesium 55	137 Ba Barium 56	41 Ti Titanium 22	42 V Vanadium 23	43 Cr Chromium 24	44 Mn Manganese 25	45 Fe Iron 26	46 Co Cobalt 27	47 Ni Nickel 28	48 Cu Copper 29	49 Zn Zinc 30	50 Ga Gallium 31
226 Ra Radium 88	227 Ac Actinium 89	51 V Vanadium 23	52 Cr Chromium 24	53 Mn Manganese 25	54 Fe Iron 26	55 Co Cobalt 27	56 Ni Nickel 28	57 Cu Copper 29	58 Zn Zinc 30	59 Ga Gallium 31	60 Ge Germanium 32
		61 Ti Titanium 22	62 V Vanadium 23	63 Cr Chromium 24	64 Mn Manganese 25	65 Fe Iron 26	66 Co Cobalt 27	67 Ni Nickel 28	68 Cu Copper 29	69 Zn Zinc 30	70 Ga Gallium 31
		71 Zr Zirconium 40	72 Nb Niobium 41	73 Mo Molybdenum 42	74 Tc Technetium 43	75 Ru Ruthenium 44	76 Rh Rhodium 45	77 Pd Palladium 46	78 Ag Silver 47	79 Cd Cadmium 48	80 In Indium 49
		81 Hf Hafnium 72	82 Ta Tantalum 73	83 W Tungsten 74	84 Re Rhenium 75	85 Os Osmium 76	86 Ir Iridium 77	87 Pt Platinum 78	88 Au Gold 79	89 Hg Mercury 80	90 Tl Thallium 81
		91 Th Thorium 90	92 Pa Protactinium 91	93 U Uranium 92	94 Np Neptunium 93	95 Pu Plutonium 94	96 Am Americium 95	97 Cm Curium 96	98 Bk Berkelium 97	99 Cf Californium 98	100 Fm Fermium 100
		101 Ac Actinium 89	102 Th Thorium 90	103 Pa Protactinium 91	104 U Uranium 92	105 Np Neptunium 93	106 Pu Plutonium 94	107 Am Americium 95	108 Cm Curium 96	109 Bk Berkelium 97	110 Cf Californium 98
		111 La Lanthanum 57	112 Ce Cerium 58	113 Pr Praseodymium 59	114 Nd Neodymium 60	115 Pm Promethium 61	116 Sm Samarium 62	117 Eu Europium 63	118 Gd Gadolinium 64	119 Tb Terbium 65	120 Dy Dysprosium 66
		121 Sc Scandium 21	122 Ti Titanium 22	123 V Vanadium 23	124 Cr Chromium 24	125 Mn Manganese 25	126 Fe Iron 26	127 Co Cobalt 27	128 Ni Nickel 28	129 Cu Copper 29	130 Zn Zinc 30
		131 Y Yttrium 39	132 Zr Zirconium 40	133 Nb Niobium 41	134 Mo Molybdenum 42	135 Tc Technetium 43	136 Ru Ruthenium 44	137 Rh Rhodium 45	138 Pd Palladium 46	139 Ag Silver 47	140 Cd Cadmium 48
		141 Hf Hafnium 72	142 Ta Tantalum 73	143 W Tungsten 74	144 Re Rhenium 75	145 Os Osmium 76	146 Ir Iridium 77	147 Pt Platinum 78	148 Au Gold 79	149 Hg Mercury 80	150 Tl Thallium 81
		151 La Lanthanum 57	152 Ce Cerium 58	153 Pr Praseodymium 59	154 Nd Neodymium 60	155 Pm Promethium 61	156 Sm Samarium 62	157 Eu Europium 63	158 Gd Gadolinium 64	159 Tb Terbium 65	160 Dy Dysprosium 66
		161 Sc Scandium 21	162 Ti Titanium 22	163 V Vanadium 23	164 Cr Chromium 24	165 Mn Manganese 25	166 Fe Iron 26	167 Co Cobalt 27	168 Ni Nickel 28	169 Cu Copper 29	170 Zn Zinc 30
		171 Y Yttrium 39	172 Zr Zirconium 40	173 Nb Niobium 41	174 Mo Molybdenum 42	175 Tc Technetium 43	176 Ru Ruthenium 44	177 Rh Rhodium 45	178 Pd Palladium 46	179 Ag Silver 47	180 Cd Cadmium 48
		179 Hf Hafnium 72	180 Ta Tantalum 73	181 W Tungsten 74	182 Re Rhenium 75	183 Os Osmium 76	184 Ir Iridium 77	185 Pt Platinum 78	186 Au Gold 79	187 Hg Mercury 80	188 Tl Thallium 81
		189 La Lanthanum 57	190 Ce Cerium 58	191 Pr Praseodymium 59	192 Nd Neodymium 60	193 Pm Promethium 61	194 Sm Samarium 62	195 Eu Europium 63	196 Gd Gadolinium 64	197 Tb Terbium 65	198 Dy Dysprosium 66
		199 Sc Scandium 21	200 Ti Titanium 22	201 V Vanadium 23	202 Cr Chromium 24	203 Mn Manganese 25	204 Fe Iron 26	205 Co Cobalt 27	206 Ni Nickel 28	207 Cu Copper 29	208 Zn Zinc 30
		209 Y Yttrium 39	210 Zr Zirconium 40	211 Nb Niobium 41	212 Mo Molybdenum 42	213 Tc Technetium 43	214 Ru Ruthenium 44	215 Rh Rhodium 45	216 Pd Palladium 46	217 Ag Silver 47	218 Cd Cadmium 48
		219 Hf Hafnium 72	220 Ta Tantalum 73	221 W Tungsten 74	222 Re Rhenium 75	223 Os Osmium 76	224 Ir Iridium 77	225 Pt Platinum 78	226 Au Gold 79	227 Hg Mercury 80	228 Tl Thallium 81
		229 La Lanthanum 57	230 Ce Cerium 58	231 Pr Praseodymium 59	232 Nd Neodymium 60	233 Pm Promethium 61	234 Sm Samarium 62	235 Eu Europium 63	236 Gd Gadolinium 64	237 Tb Terbium 65	238 Dy Dysprosium 66
		239 Sc Scandium 21	240 Ti Titanium 22	241 V Vanadium 23	242 Cr Chromium 24	243 Mn Manganese 25	244 Fe Iron 26	245 Co Cobalt 27	246 Ni Nickel 28	247 Cu Copper 29	248 Zn Zinc 30
		249 Y Yttrium 39	250 Zr Zirconium 40	251 Nb Niobium 41	252 Mo Molybdenum 42	253 Tc Technetium 43	254 Ru Ruthenium 44	255 Rh Rhodium 45	256 Pd Palladium 46	257 Ag Silver 47	258 Cd Cadmium 48
		259 Hf Hafnium 72	260 Ta Tantalum 73	261 W Tungsten 74	262 Re Rhenium 75	263 Os Osmium 76	264 Ir Iridium 77	265 Pt Platinum 78	266 Au Gold 79	267 Hg Mercury 80	268 Tl Thallium 81
		269 La Lanthanum 57	270 Ce Cerium 58	271 Pr Praseodymium 59	272 Nd Neodymium 60	273 Pm Promethium 61	274 Sm Samarium 62	275 Eu Europium 63	276 Gd Gadolinium 64	277 Tb Terbium 65	278 Dy Dysprosium 66
		279 Sc Scandium 21	280 Ti Titanium 22	281 V Vanadium 23	282 Cr Chromium 24	283 Mn Manganese 25	284 Fe Iron 26	285 Co Cobalt 27	286 Ni Nickel 28	287 Cu Copper 29	288 Zn Zinc 30
		289 Y Yttrium 39	290 Zr Zirconium 40	291 Nb Niobium 41	292 Mo Molybdenum 42	293 Tc Technetium 43	294 Ru Ruthenium 44	295 Rh Rhodium 45	296 Pd Palladium 46	297 Ag Silver 47	298 Cd Cadmium 48
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		309 La Lanthanum 57	310 Ce Cerium 58	311 Pr Praseodymium 59	312 Nd Neodymium 60	313 Pm Promethium 61	314 Sm Samarium 62	315 Eu Europium 63	316 Gd Gadolinium 64	317 Tb Terbium 65	318 Dy Dysprosium 66
		319 Sc Scandium 21	320 Ti Titanium 22	321 V Vanadium 23	322 Cr Chromium 24	323 Mn Manganese 25	324 Fe Iron 26	325 Co Cobalt 27	326 Ni Nickel 28	327 Cu Copper 29	328 Zn Zinc 30
		329 Y Yttrium 39	330 Zr Zirconium 40	331 Nb Niobium 41	332 Mo Molybdenum 42	333 Tc Technetium 43	334 Ru Ruthenium 44	335 Rh Rhodium 45	336 Pd Palladium 46	337 Ag Silver 47	338 Cd Cadmium 48
		339 Hf Hafnium 72	340 Ta Tantalum 73	341 W Tungsten 74	342 Re Rhenium 75	343 Os Osmium 76	344 Ir Iridium 77	345 Pt Platinum 78	346 Au Gold 79	347 Hg Mercury 80	348 Tl Thallium 81
		349 La Lanthanum 57	350 Ce Cerium 58	351 Pr Praseodymium 59	352 Nd Neodymium 60	353 Pm Promethium 61	354 Sm Samarium 62	355 Eu Europium 63	356 Gd Gadolinium 64	357 Tb Terbium 65	358 Dy Dysprosium 66
		359 Sc Scandium 21	360 Ti Titanium 22	361 V Vanadium 23	362 Cr Chromium 24	363 Mn</					