UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICAL SCIENCE **0652/01**

Paper 1 Multiple Choice **October/November 2008**

45 minutes

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

6621191541

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 Diagram 1 shows the paper chromatogram of substance X.

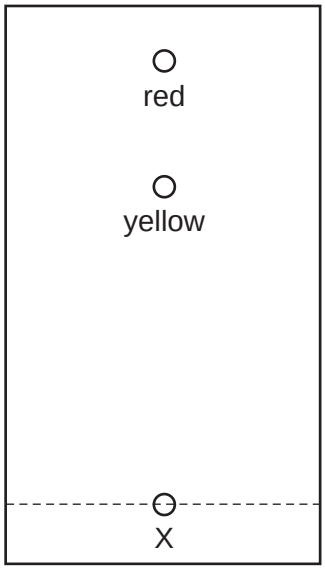


diagram 1

Diagram 2 shows the cooling curve for substance Y.

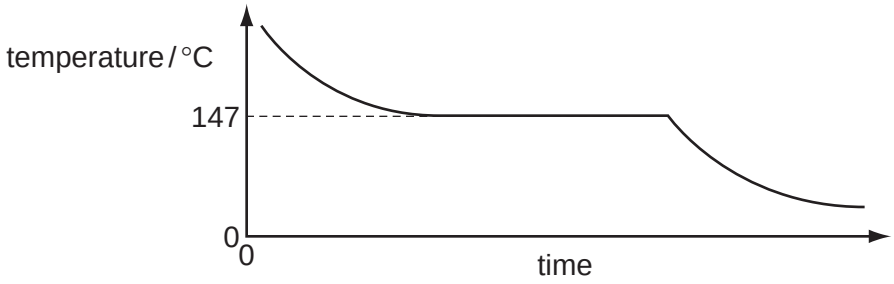


diagram 2

Which statement about X and Y is correct?

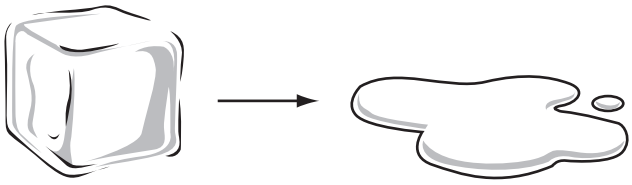
A X is a mixture and Y is a pure substance.

B X is a pure substance and Y is a mixture.

C X and Y are mixtures.

D X and Y are pure substances.

2 An ice cube melts.



ice cube pool of water

What happens to the molecules of water in the ice cube?

A They condense.

B They dissolve.

C They gain energy.

D They lose energy.

3 Element Q has a nucleon number of 11. Its atoms each have six neutrons in the nucleus.

In which Group of the Periodic Table is element Q?

A I **B** II **C** III **D** V

4 Which two substances conduct electricity?

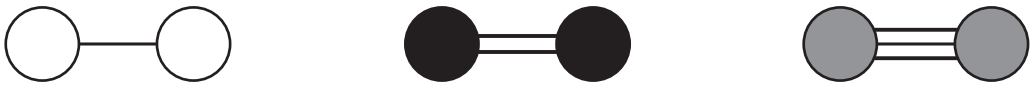
A brass (an alloy) and hydrogen chloride

B hydrogen chloride and solid potassium iodide

C solid potassium iodide and concentrated hydrochloric acid

D concentrated hydrochloric acid and brass

5 The diagrams show the bonding in three covalent molecules.



1 2 3

Which of these molecules combine to form ammonia?

A 1 and 2 only

B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3

6 Which substance does **not** require oxygen in order to produce energy?

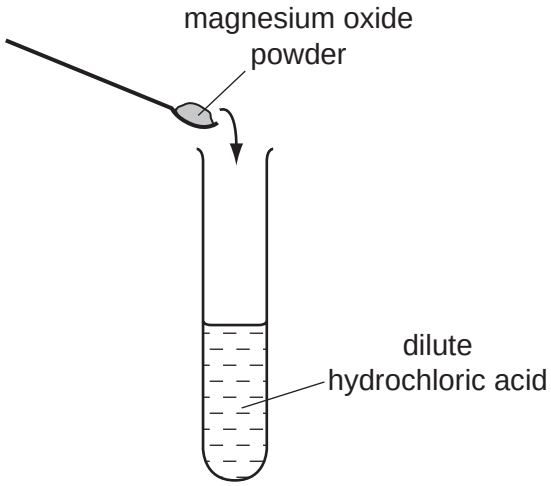
A coal

B hydrogen

C natural gas

D ^{235}U

7 The diagram shows an experiment.



The temperature of the resulting solution is higher than that of the acid.

Which terms describe the reaction?

A endothermic and neutralisation

B endothermic and oxidation

C exothermic and neutralisation

D exothermic and oxidation

8 The oxides of two elements, X and Y, are separately dissolved in water and the pH of each solution tested.

oxide tested	pH of solution
X	1
Y	13

Which information about X and Y is correct?

	oxide is acidic	oxide is basic	metal	non-metal
A	X	Y	X	Y
B	X	Y	Y	X
C	Y	X	X	Y
D	Y	X	Y	X

9 Carbon dioxide is produced when dilute hydrochloric acid reacts with

A bauxite.

B graphite.

C limestone.

D rust.

10 Aqueous ammonia is added to a solution of a metal sulphate.

A green precipitate that is insoluble in excess of the aqueous ammonia forms.

Which metal ion is present?

A Cu^{2+} **B** Fe^{2+} **C** Fe^{3+} **D** Zn^{2+}

11 The element technetium, Tc (proton number 43), does not exist in nature.

From its position in the Periodic Table, which description of technetium is most likely to be correct?

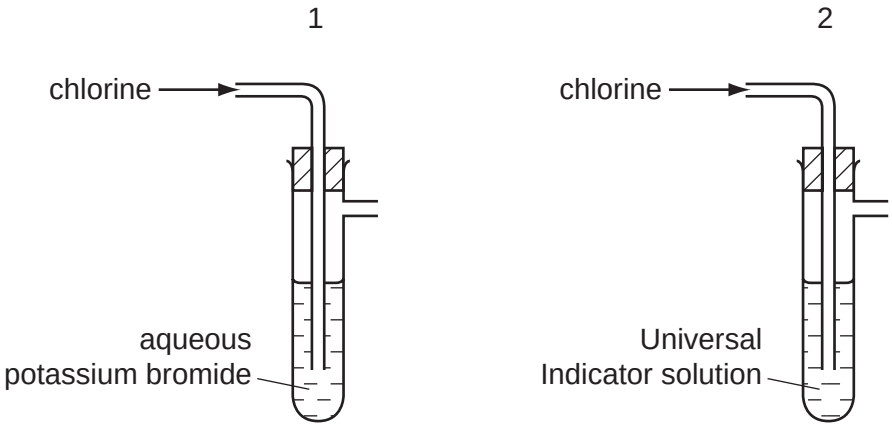
A It is a brittle solid of low melting point.

B It is a metal with a high melting point.

C It is a soft, very reactive metal.

D It is an unreactive gas.

12 The diagrams show apparatus used to test the reaction of chlorine with different liquid



In which test-tubes is an orange-brown colour produced?

A both 1 and 2

B 1 only

C 2 only

D neither 1 nor 2

13 The diagram shows part of the Periodic Table.

key

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

At room temperature

1 all the metals shown are solid.

2 none of the non-metals shown is liquid.

Which of these statements are correct?

A both 1 and 2

B 1 only

C 2 only

D neither 1 nor 2

14 Which of the oxides CuO, MgO and Na_2O can be reduced by heating with carbon?

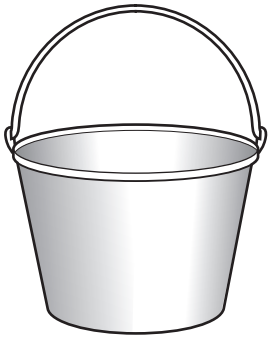
A CuO only

B MgO only

C Na_2O only

D CuO, MgO and Na_2O

15 The diagrams show two items that may be found in the home. Each item contains zinc.



galvanised bucket

brass door-knocker

In which items is the zinc used as an alloy?

	bucket	door-knocker
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

16 Sodium chloride is mined from underground rock salt by using hot water.

Which term describes the use of water in this process?

A electrolyte

B filtrate

C solute

D solvent

17 What is acetylene used for?

A as a fuel for aircraft

B as a fuel for welding

C for filling electric lamps

D for filling weather balloons

18 Which compound would **not** be an important part of a garden fertiliser?

A $Ca_3(PO_4)_2$ **B** KNO_3 **C** $Mg(OH)_2$ **D** $(NH_4)_2SO_4$

19 Which of bromine and steam can react with ethene?

	bromine	steam
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

20 An addition polymer consists of a long chain of monomer units.

What are the names of the polymer and monomer?

	polymer	monomer
A	poly(ethane)	ethane
B	poly(ethane)	ethene
C	poly(ethene)	ethane
D	poly(ethene)	ethene

21 Two digital stopwatches X and Y, which record in minutes and seconds, are used to t

The readings of the two stopwatches, at the start and at the end of the race, are shown.

	start	end
X	00:00	00:40

	start	end
Y	01:30	02:20

Which statement about the time of the race is correct?

A Both stopwatches recorded the same time interval.

B Stopwatch X recorded 10 s longer than stopwatch Y.

C Stopwatch Y recorded 10 s longer than stopwatch X.

D Stopwatch Y recorded 50 s longer than stopwatch X.

22 A car travels at various speeds during a short journey.

The table shows the distances travelled and the time taken during each of four stages P, Q, R and S.

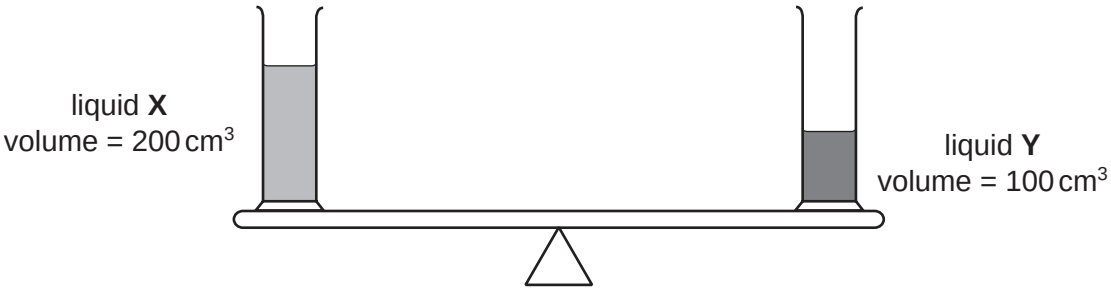
stage	P	Q	R	S
distance travelled / km	1.8	3.6	2.7	2.7
time taken / minutes	2	2	4	3

During which two stages is the car travelling at the same speed?

A P and Q **B** P and S **C** Q and R **D** R and S

23 Two identical measuring cylinders containing different liquids are placed on a simple

They balance as shown.



How does the density of X compare with the density of Y?

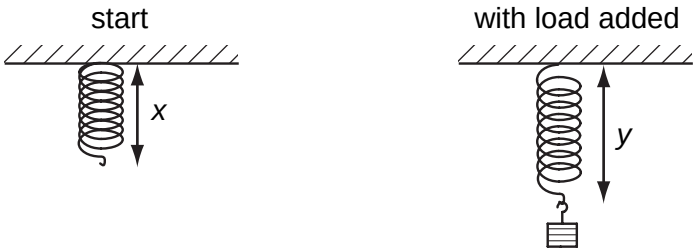
A density of X = $\frac{1}{2}$ × density of Y

B density of X = density of Y

C density of X = 2 × density of Y

D density of X = 4 × density of Y

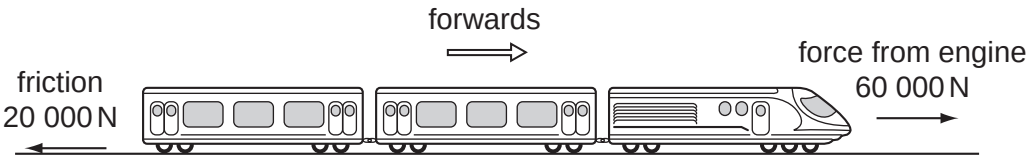
24 A student carries out an experiment to plot the extension-load graph for a spring. The diagrams show the apparatus at the start of the experiment and with a load added.



What is the extension caused by the load?

A x **B** y **C** $y + x$ **D** $y - x$

25 A train is travelling along a horizontal track at constant speed. Two of the forces a… train are shown in the diagram.



A force of air resistance is also acting on the train to give it a resultant force of zero.

What is this air resistance force?

A 40 000 N backwards

B 80 000 N backwards

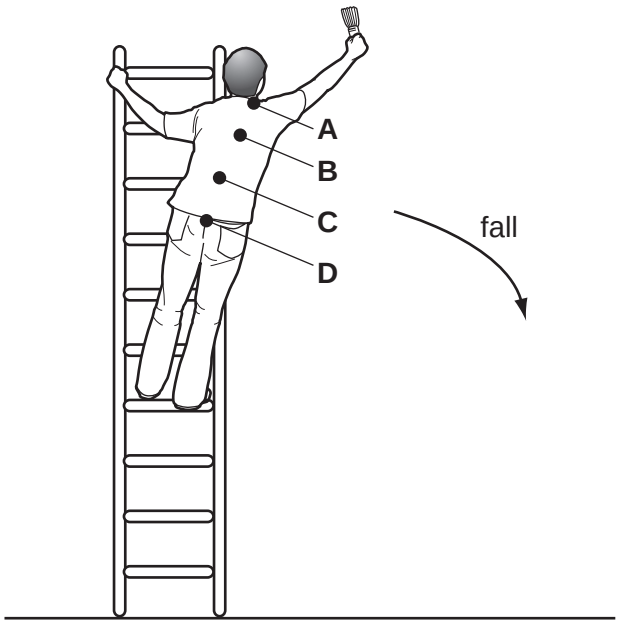
C 40 000 N forwards

D 80 000 N forwards

26 A man is standing on a ladder painting a wall. He leans over too far and the ladder starts to fall.

The diagram shows his position just before the ladder starts to fall.

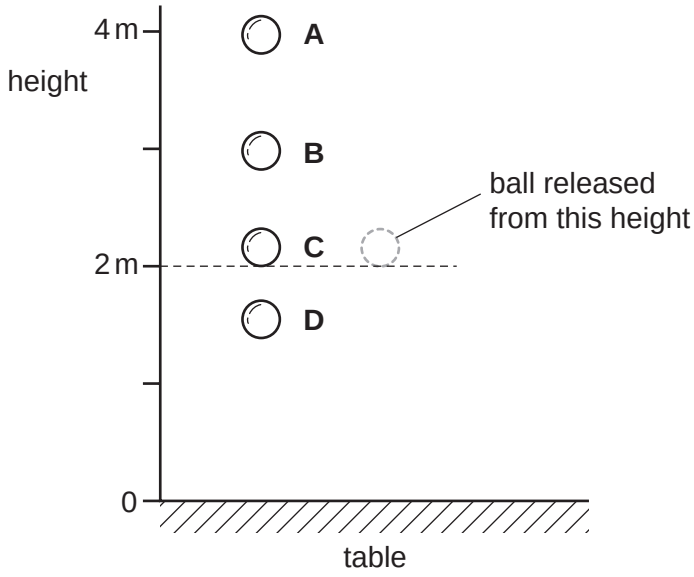
At which point is the combined centre of mass of the man and the ladder?



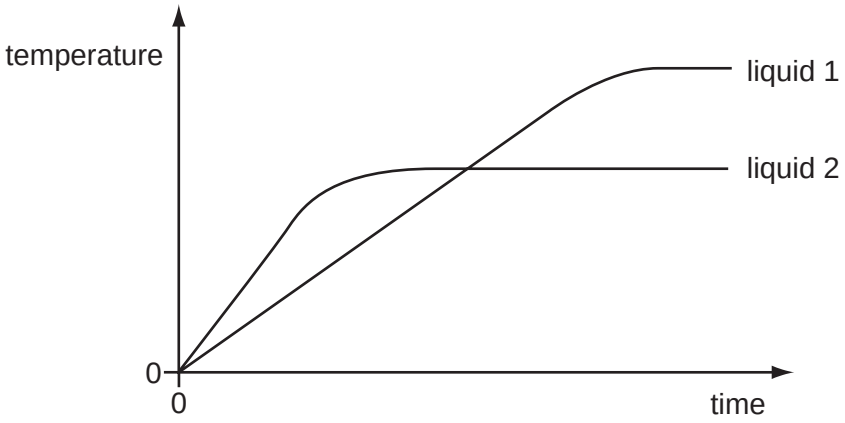
27 A rubber ball is dropped from a height of 2 metres onto a table.

Whilst in contact with the table, some of its energy is converted into heat energy.

What is the highest possible point the ball could reach after bouncing?



28 Equal masses of two different liquids are heated using the same heater. The graph shows how the temperature of each liquid changes with time.



What does the graph tell us about the liquids?

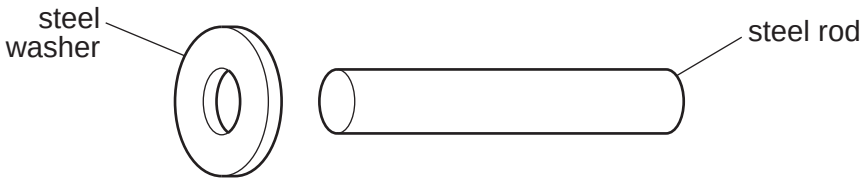
A Liquid 1 has a higher melting point than liquid 2.

B Liquid 1 has a higher boiling point than liquid 2.

C Liquid 1 starts to melt sooner than liquid 2.

D Liquid 1 starts to boil sooner than liquid 2.

29 An engineer wants to fix a steel washer on to a steel rod. The rod is just too big to fit [illegible] of the washer.



How can the engineer fit the washer onto the rod?

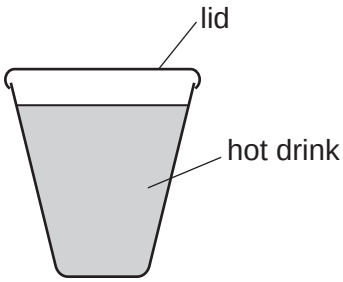
A Cool the washer and put it over the rod.

B Cool the washer and rod to the same temperature and push them together.

C Heat the rod and then place it in the hole.

D Heat the washer and then place it over the rod.

30 A white plastic lid is placed on a plastic cup used for a hot drink.



This would have no effect on the loss of heat by

A conduction.

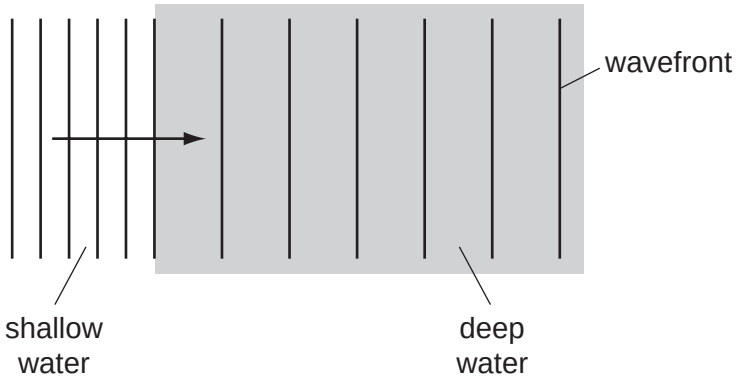
B convection.

C evaporation.

D radiation.

31 Waves in a tank pass from shallow to deep water.

The wavefront diagram is shown.



Which quantity increases as the waves enter the deep water?

A amplitude

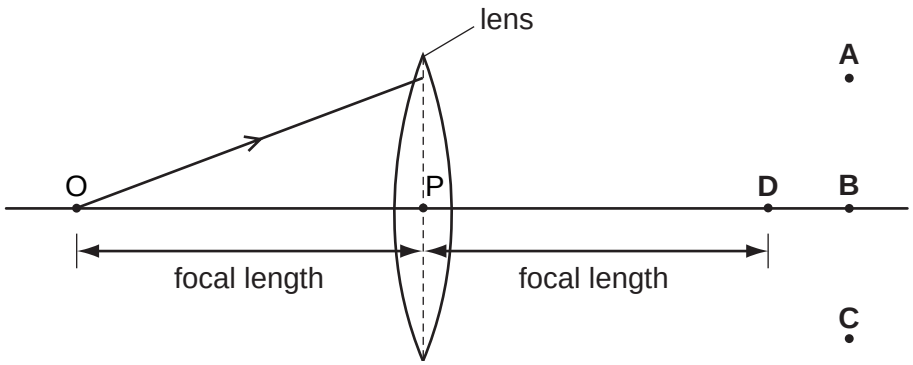
B frequency

C wave energy

D wavelength

32 In the diagram, the distance OP is the focal length of the lens.

Through which point will the ray shown pass, after refraction by the lens?

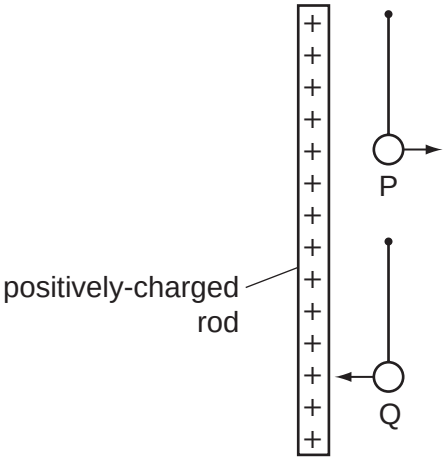


33 Two metal bars are held together. At least one of the bars is a magnet. The bars repel each other.

What does this show about the bars and why?

	what it shows	why
A	only one of the bars is a magnet	two magnets always attract each other
B	only one of the bars is a magnet	induced magnetism in the other bar makes it repel
C	they are both magnets	there must be like poles facing each other
D	they are both magnets	there must be opposite poles facing each other

34 Two charged balls P and Q are hung, one above the other, from nylon threa[illegible]. A positively-charged plastic rod is placed alongside them, P is repelled and Q is attracted.



What are the charges on P and on Q?

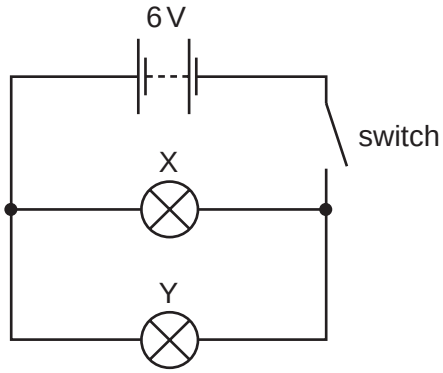
	charge on P	charge on Q
A	negative	negative
B	negative	positive
C	positive	negative
D	positive	positive

35 The table shows the voltage and current ratings for four electric heaters.

Which heater has the least resistance?

	voltage / V	current / A
A	110	5.0
B	110	10.0
C	230	5.0
D	230	10.0

36 In the circuit below, X and Y are identical 6 V lamps.



What happens when the switch is closed (switched on)?

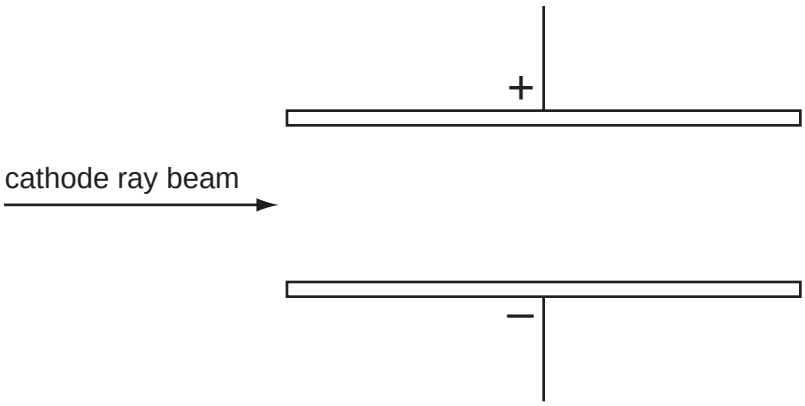
A X lights more brightly than Y.

B Y lights more brightly than X.

C X and Y both light with full brightness.

D X and Y both light with half brightness.

37 A beam of cathode rays passes through an electric field between charged parallel plates.



In which direction is the beam deflected?

A towards the negative plate

B towards the positive plate

C into the page

D out of the page

38 Which material is commonly used as a lining for a box for storing radioactive samples?

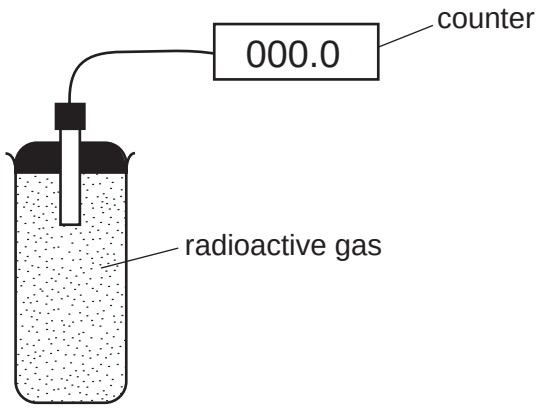
A aluminium

B copper

C lead

D uranium

39 The diagram shows an experiment to monitor the radiation from a radioactive gas. The counter readings are corrected for background radiation.



The table shows how the counter reading varies with time.

time / seconds	0	20	40	60	80	100	120	140	160	180
counter reading / counts per minute	140	105	82	61	44	36	27	20	15	10

What is the half-life of the gas?

A between 20 and 40 seconds

B between 40 and 60 seconds

C between 60 and 140 seconds

D between 140 and 180 seconds

40 A uranium nuclide $^{238}_{92}U$ emits an α-particle.

What are the new nucleon and proton numbers?

	nucleon number	proton number
A	238	88
B	236	90
C	234	92
D	234	90

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II										III	IV	V	VI	VII	0
							1 H Hydrogen 1									4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4										11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12										27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
†90-103 Actinoid series

Key: a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).