



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

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CO-ORDINATED SCIENCES

0654/01

Paper 1 Multiple Choice

October/November 2007

45 minutes

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

* 2 5 2 8 8 4 5 2 2 0 *

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.

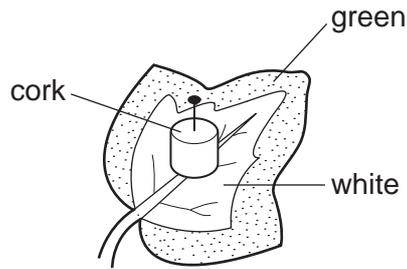
This document consists of **18** printed pages and **2** blank pages.



1 Which feature is characteristic only of birds?

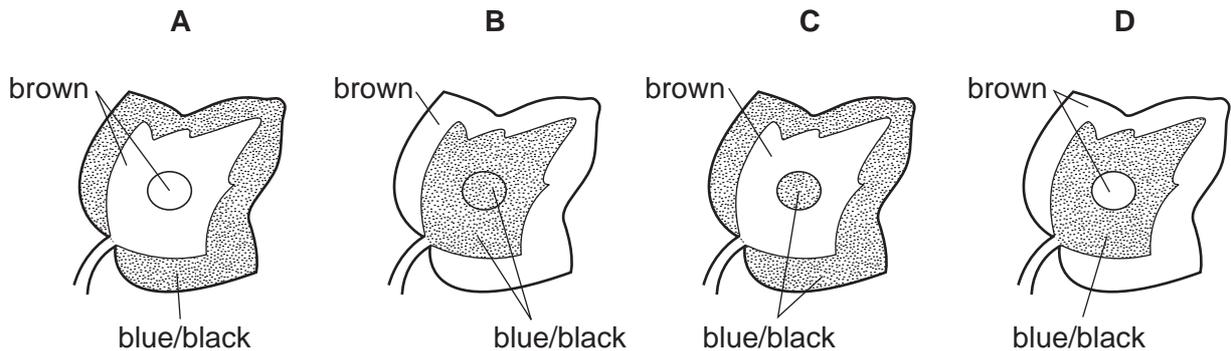
- A feathers and scales
- B fins and hard-shelled eggs
- C hair and scales
- D skin and soft-shelled eggs

2 The diagram shows a cork pinned to a leaf of a plant which is then exposed to light for 8 hours.



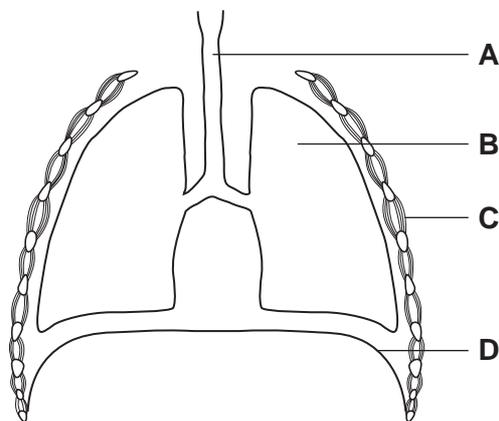
The leaf is then removed from the plant and a starch test carried out on it.

Which diagram shows the result of this starch test?



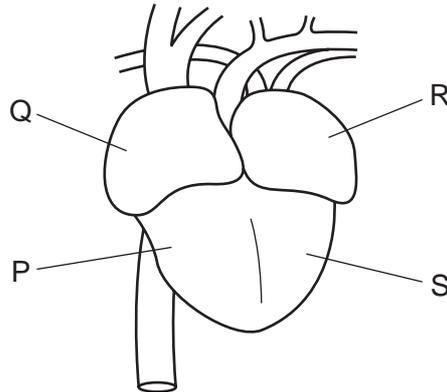
3 The diagram shows a section through the human thorax.

Which structure contains goblet cells and cilia?



- 4 Which structures make up the nervous system?
- A brain, nerves, spinal cord
 - B effectors, impulses, spinal cord
 - C impulses, muscles, nerves
 - D effectors, receptors, stimuli

- 5 The diagram shows a human heart, seen from the front.



Which shows the sequence in which a blood cell passes through the four chambers of the heart?

- A $P \rightarrow S \rightarrow R \rightarrow Q$
 - B $Q \rightarrow P \rightarrow R \rightarrow S$
 - C $R \rightarrow Q \rightarrow P \rightarrow S$
 - D $S \rightarrow R \rightarrow Q \rightarrow P$
- 6 Which process in living organisms does **not** use energy from respiration?
- A growth
 - B movement
 - C photosynthesis
 - D temperature maintenance

7 Food tests are performed on four substances.

Which substance contains fat and protein?

	test reagent			
	Benedict's	biuret	ethanol	iodine
A	✓	x	x	✓
B	✓	✓	x	x
C	x	✓	✓	x
D	x	x	✓	✓

key

✓ = positive test result

x = negative test result

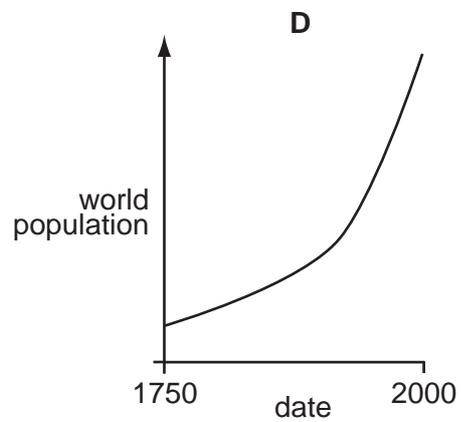
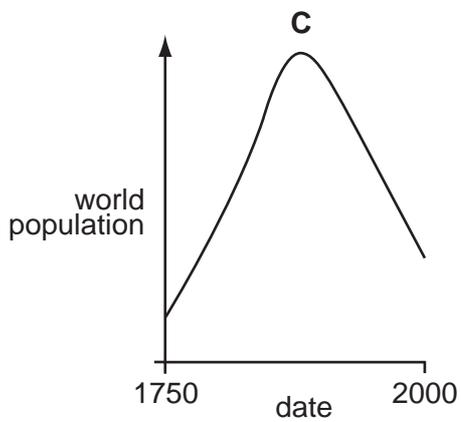
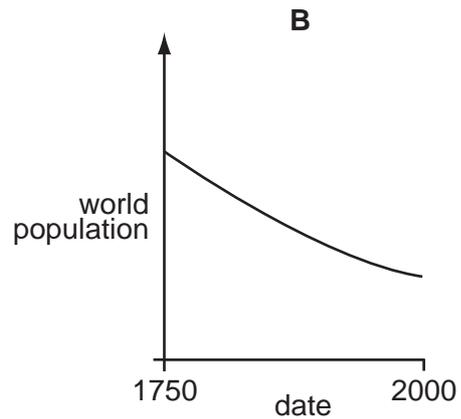
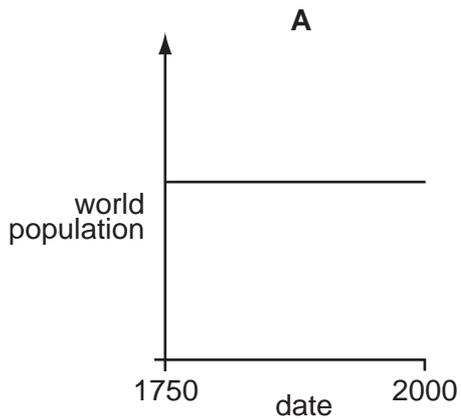
8 What is a cause and a symptom of scurvy?

	cause	symptom
A	lack of vitamin C	bleeding gums
B	lack of vitamin C	soft bones and teeth
C	lack of vitamin D	bleeding gums
D	lack of vitamin D	soft bones and teeth

9 What is most likely to happen if a diet contains excess proteins?

- A** Bacteria will form acids in the mouth.
- B** More amylase will be secreted by the pancreas.
- C** More fibre will be removed through the anus.
- D** More urea will be excreted by the kidneys.

10 Which graph shows the change in world population between 1750 and 2000?



11 In human reproduction, where does fertilisation usually take place?

- A** ovary
- B** oviduct
- C** uterus
- D** vagina

12 Which shows the number of chromosomes in an organism and in its male and female gametes?

	organism	male gamete	female gamete
A	14	7	7
B	16	32	16
C	19	17	36
D	46	22	22

13 What can lead to global warming?

	nitrogen fixation	deforestation	denitrification	burning of fossil fuels
A	✓	✓	✓	x
B	x	x	✓	✓
C	✓	x	✓	x
D	x	✓	x	✓

14 The proton number of element X is 44. Its nucleon number is 145.

How many neutrons are there in an atom of X?

- A** 44 **B** 101 **C** 145 **D** 189

15 An atom has 2 electrons in its outer shell.

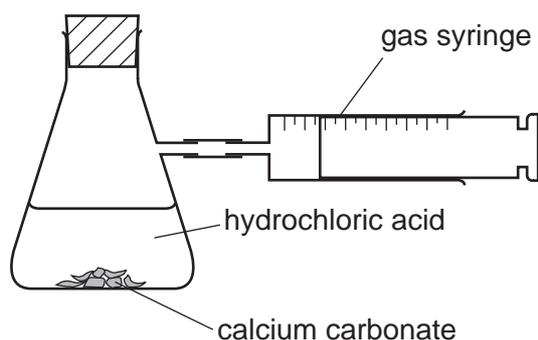
Which element could this atom be?

	Ca	He
A	✓	✓
B	✓	x
C	x	✓
D	x	x

16 Which material is made from silicon(IV) oxide combined with metal oxides?

- A** brass
B glass
C polythene
D steel

- 17 The apparatus shown is used to investigate the speed of reaction between hydrochloric acid and calcium carbonate.



The time to collect 50 cm^3 of gas is measured. Using concentrated acid and lumps of calcium carbonate, the time is 150 s.

In a second experiment, the time is 90 s.

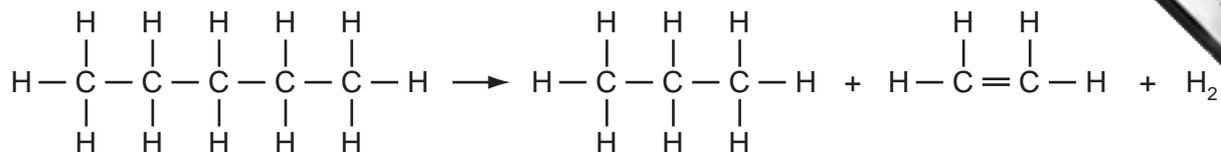
Which change was made in the second experiment?

- A larger lumps of calcium carbonate
 - B less concentrated acid
 - C lower temperature
 - D powdered calcium carbonate
- 18 The table shows physical properties of some substances.

Which substance is metal?

	malleability	density	electrical conductivity
A	brittle	high density	high
B	brittle	low density	low
C	malleable	high density	high
D	malleable	low density	low

- 19 A petrochemical molecule undergoes the chemical change shown.



What is the chemical change?

- A cracking
 B fractional distillation
 C polymerisation
 D reduction
- 20 Glucose gives a red precipitate when tested with reagent X.

Cellulose, a protein and starch are broken down into their monomers.

Which of these monomers also give a red precipitate when tested with reagent X?

	cellulose	protein	starch
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

- 21 A reagent in solution is added to a solid sample of a fertiliser. The mixture is warmed and the gas given off changes the colour of damp litmus paper.

The test shows that the fertiliser contains ammonium ions.

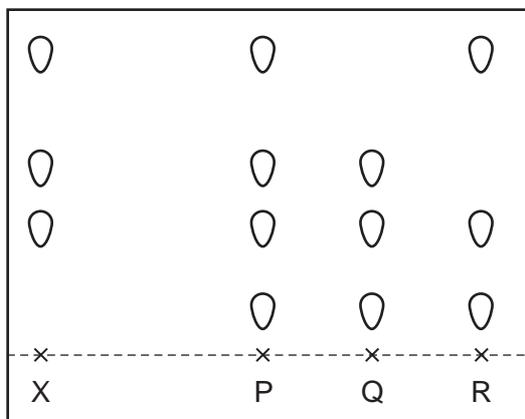
What is the reagent and what is the **original** colour of the litmus paper used in the test?

	reagent	colour of litmus paper
A	acid	blue
B	acid	red
C	alkali	blue
D	alkali	red

22 A plant colour X is a mixture.

Chromatography is used to compare X with three other coloured mixtures, P, Q and R.

The results are shown in the diagram.



Which other mixtures contain the plant colour X?

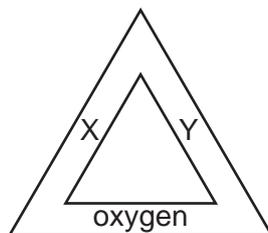
- A P only
- B P and Q only
- C R only
- D P, Q and R

23 The element sulphur forms a colloid with water.

How are the sulphur particles held in the water and how do the particles affect a light beam shone on to the colloid?

	the particles are	the light beam is
A	dissolved	reflected
B	dissolved	scattered
C	suspended	reflected
D	suspended	scattered

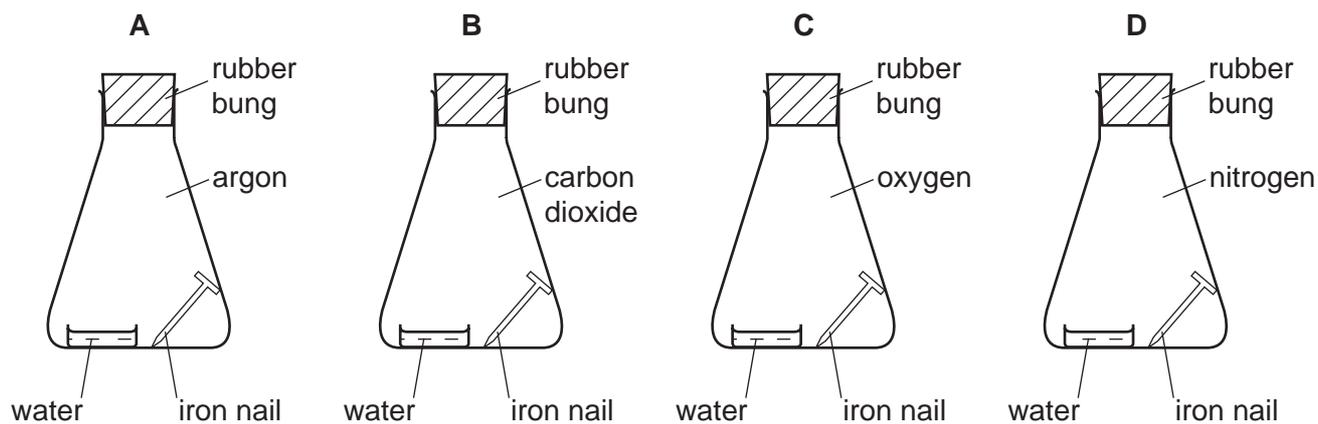
24 The diagram shows a fire triangle.



What are X and Y?

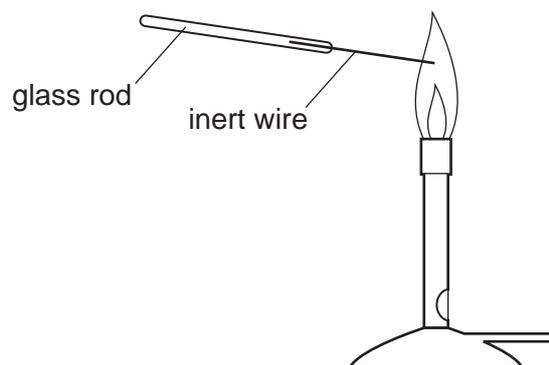
	X	Y
A	air	catalyst
B	air	heat
C	fuel	catalyst
D	fuel	heat

25 In which flask does iron rust?



26 In separate experiments, an inert wire is dipped into two solutions, P and Q.

The wire is then placed in the flame of a Bunsen burner.



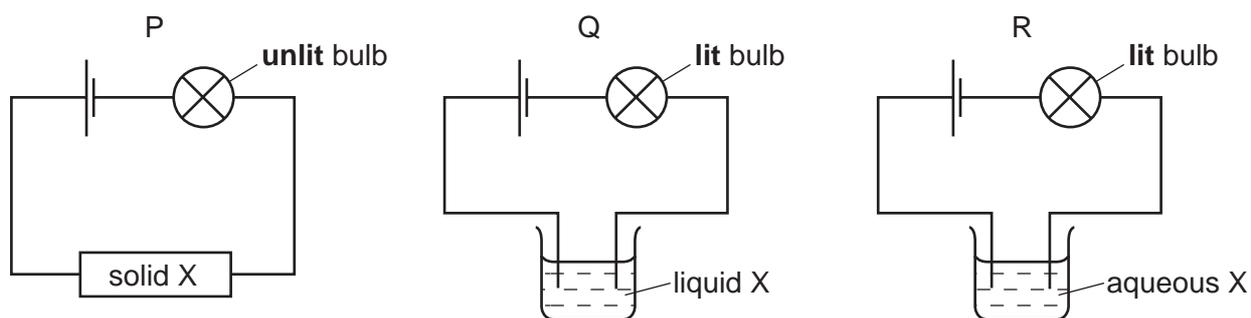
The table shows the results.

	solution P	solution Q
colour of Bunsen flame	green	yellow

Which metal ions are present in the solutions?

	P	Q
A	copper	potassium
B	copper	sodium
C	sodium	copper
D	sodium	potassium

27 Substance X is an ionic compound.

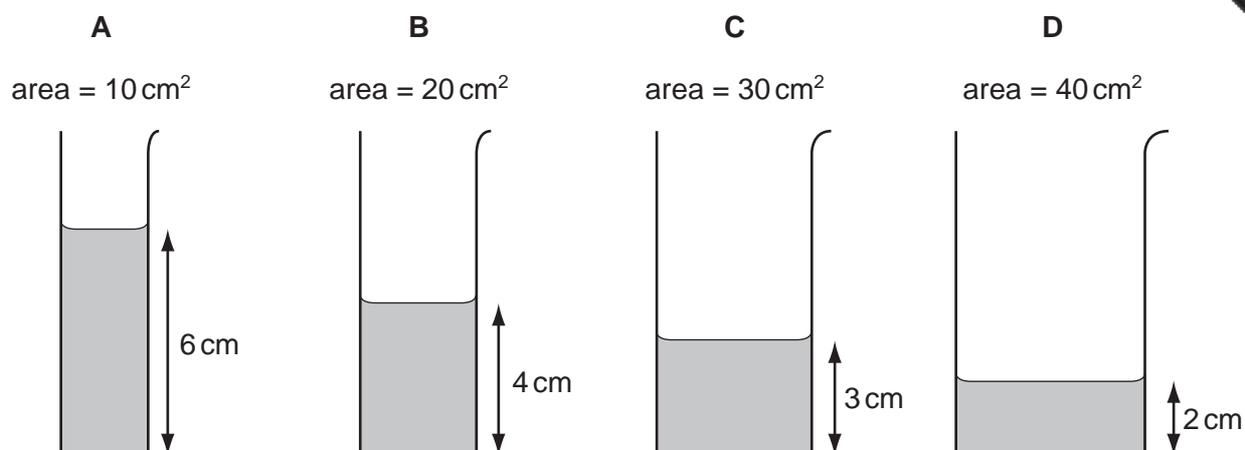


Which diagrams are correct for X?

- A** P and Q only
- B** P and R only
- C** R and Q only
- D** P, Q and R

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

Which tube contains the largest volume of water?



29 What are the correct units for force and for weight?

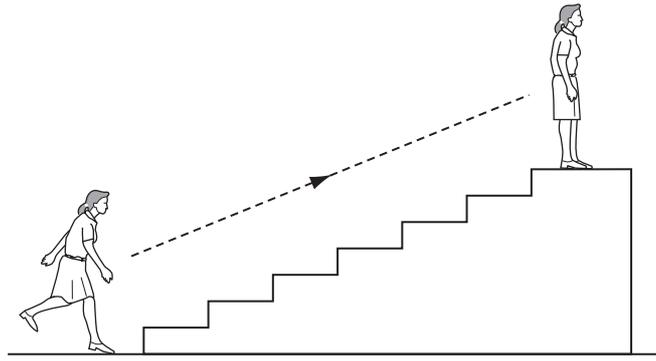
	force	weight
A	kg	kg
B	kg	N
C	N	kg
D	N	N

30 A metal drum has a mass of 200 kg when empty and 1000 kg when filled with 1.0 m^3 of 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

- 31 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 kinetic energy and gravitational potential energy
- B kinetic energy and nuclear energy
- C gravitational potential energy and heat energy
- D nuclear energy and heat energy

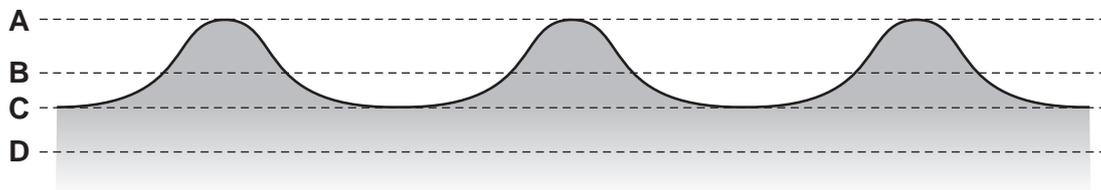
- 32 Some gas in a sealed plastic bag is cooled.

How do the gas molecules behave when this happens?

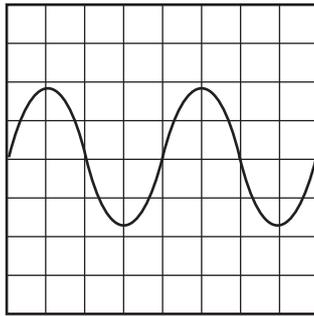
- A They move more quickly and become closer together.
- B They move more quickly and become further apart.
- C They move more slowly and become closer together.
- D They move more slowly and become further apart.

- 33 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?



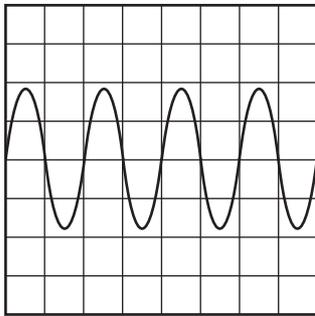
34 The diagram represents a sound wave.



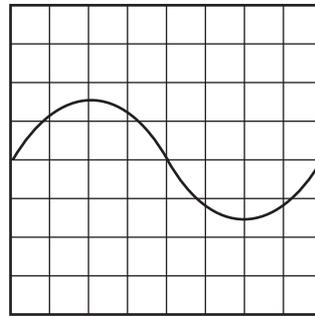
The frequency of the sound is increased.

The diagrams below are shown to the same scale. Which diagram represents the new sound wave?

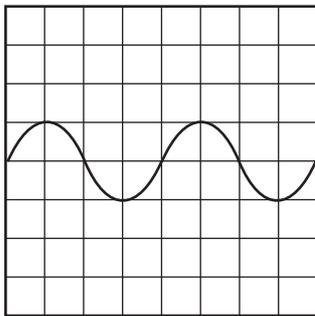
A



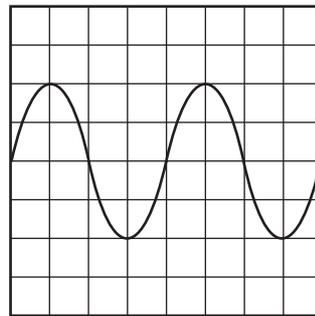
B



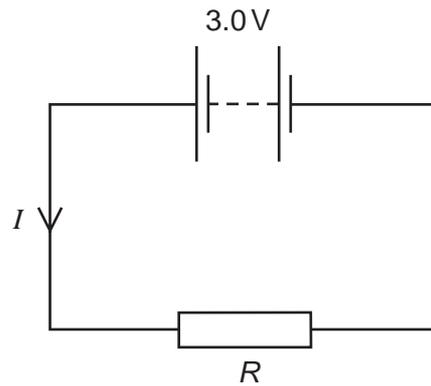
C



D



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



Which line gives possible values of I and R ?

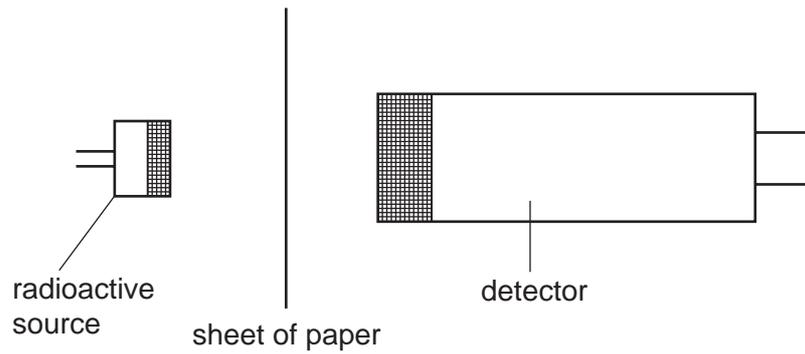
	I/A	R/Ω
A	1.5	1.5
B	1.5	2.0
C	6.0	2.0
D	4.0	12

- 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.

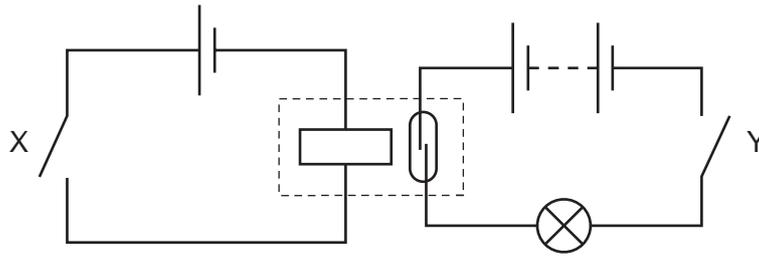
37 A sheet of paper is placed between a radioactive source and a detector.



Which types of radiation can pass through the paper?

- A alpha radiation and beta radiation only
 - B alpha radiation and gamma radiation only
 - C beta radiation and gamma radiation only
 - D alpha radiation, beta radiation and gamma radiation
- 38 Which energy source is **not** renewable?
- A hydroelectric
 - B nuclear
 - C solar
 - D wind
- 39 The output from a power station is connected to the transmission cables through a transformer.
- What is the purpose of the transformer?
- A to change the frequency of the output
 - B to increase the current
 - C to increase the voltage
 - D to turn the current into alternating current

40 The diagram shows the use of a reed relay.



Which switch positions cause the lamp to light?

	X	Y
A	closed	closed
B	closed	open
C	open	closed
D	open	open

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
		59 Nb Niobium 41	60 Mo Molybdenum 42	61 Tc Technetium 43	62 Ru Ruthenium 44	63 Rh Rhodium 45	64 Pd Palladium 46	65 Ag Silver 47	66 Cd Cadmium 48	67 In Indium 49	68 Sn Tin 50
		69 Ta Tantalum 73	70 W Tungsten 74	71 Re Rhenium 75	72 Os Osmium 76	73 Ir Iridium 77	74 Pt Platinum 78	75 Au Gold 79	76 Hg Mercury 80	77 Tl Thallium 81	78 Pb Lead 82
		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 Es Einsteinium 99
		101 Th Thorium 90	102 Pa Protactinium 91	103 U Uranium 92	104 Np Neptunium 93	105 Pu Plutonium 94	106 Am Americium 95	107 Cm Curium 96	108 Bk Berkelium 97	109 Cf Californium 98	110 Es Einsteinium 99
		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
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