

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**CO-ORDINATED SCIENCES**

**0654/01**

Paper 1 Multiple Choice

October/November 2005

**45 minutes**

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

**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.

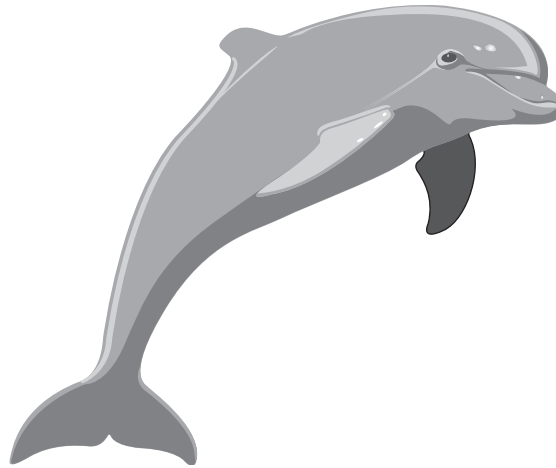
Any rough working should be done in this booklet.

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

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

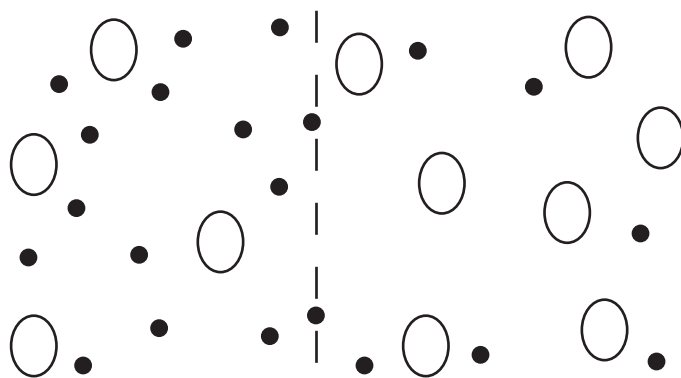


- 1 The diagram shows a dolphin, a mammal that lives in the sea.



Which feature identifies a dolphin as a mammal?

- A** constant body temperature  
**B** lays eggs  
**C** scaly skin  
**D** swims with fins
- 2 The diagram shows a partially permeable membrane through which molecules pass only by osmosis.



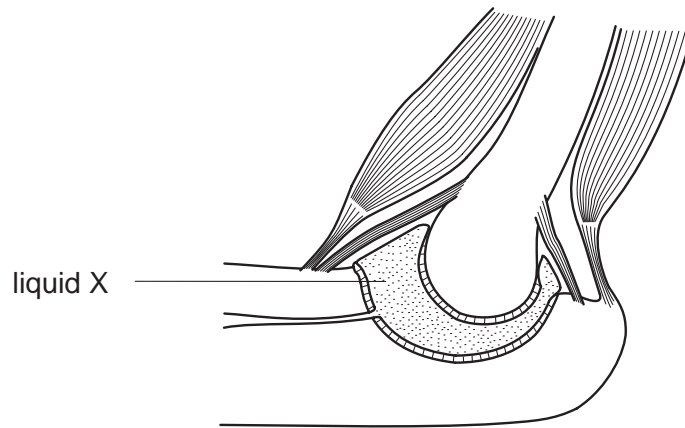
key

- molecule P  
 ● molecule Q  
 | partially permeable membrane

What is molecule Q?

- A** amino acid  
**B** starch  
**C** sugar  
**D** water

- 3 The diagram shows the structure of the elbow joint.

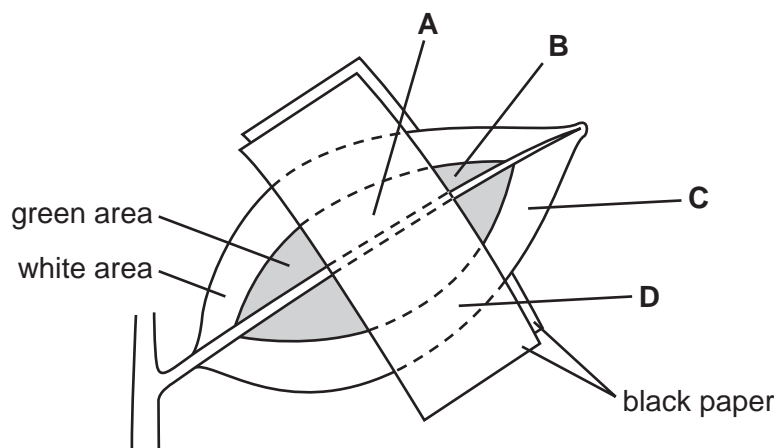


What is the function of liquid X?

- A attaching the bones to one another
  - B reducing friction during movement
  - C supplying oxygen to the tissues
  - D supporting the joint
- 4 The diagram shows a leaf, still attached to a plant, with both green and white regions that have been partly covered with black paper.

The leaf is left in bright light for six hours and then tested for starch.

Which area of the leaf turns blue-black after the starch test?



- 5 What occurs in aerobic respiration?

- A production of lactic acid
- B release of energy
- C release of oxygen
- D storage of glucose

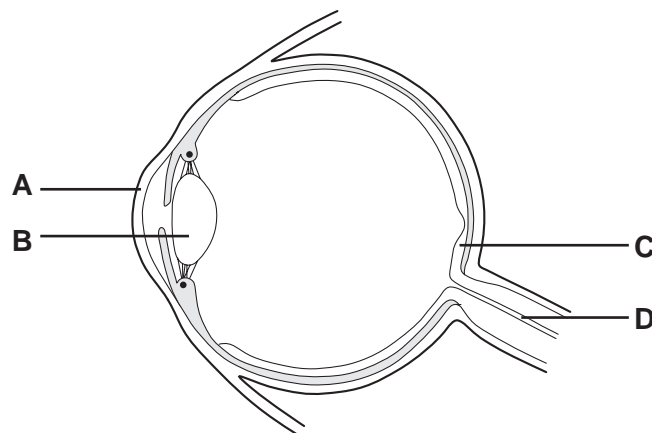
- 6 Some liquid is collected from the xylem of a plant.

What is present in the liquid?

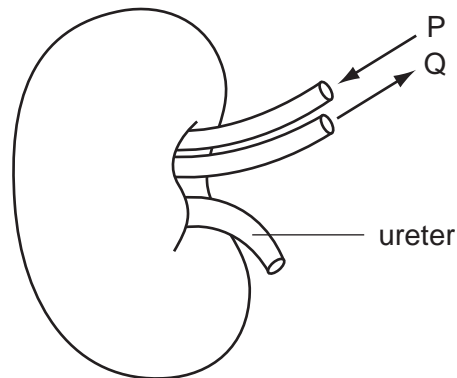
- A amino acids
  - B inorganic ions
  - C starch
  - D sugar
- 7 Which name is given to the removal, through the anus, of substances that have not been digested?
- A absorption
  - B digestion
  - C egestion
  - D excretion
- 8 Kwashiorkor is a disease that affects young children who do not have enough protein to eat.
- Which is the best food to add to a diet largely of carbohydrate to prevent Kwashiorkor?
- A bread
  - B fish
  - C fruit
  - D rice

- 9 The diagram shows a section through the eye.

In which structure are stimuli converted to nerve impulses?

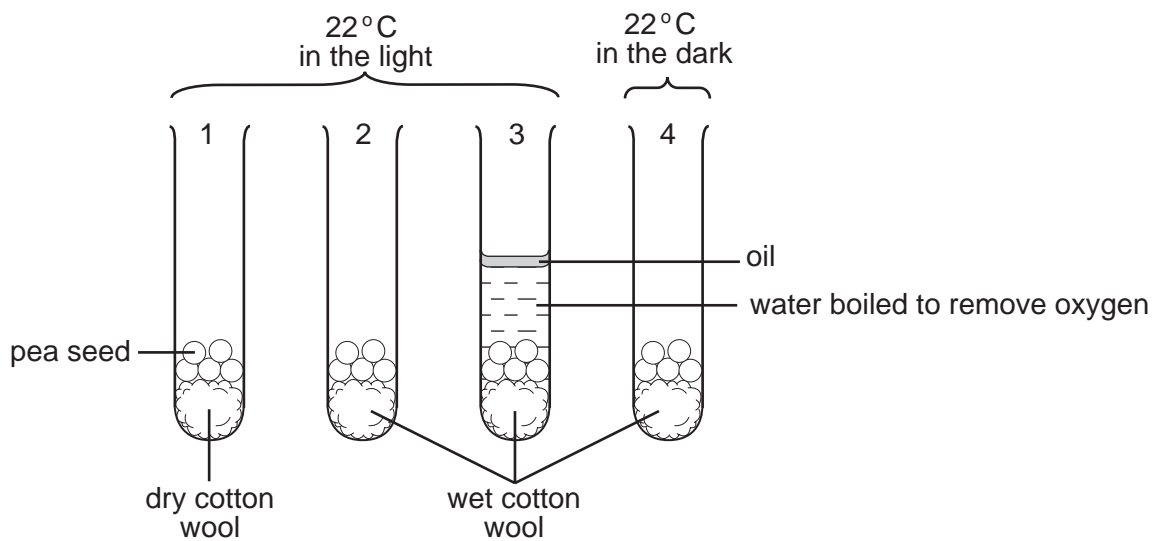


- 10 The diagram shows a human kidney and its blood supply.



Compared with the blood in vessel P, the blood in Q has

- A less urea and less oxygen.
  - B less urea and more oxygen.
  - C more urea and less oxygen.
  - D more urea and more oxygen.
- 11 The diagram shows an experiment to demonstrate that in order to germinate, pea seeds need oxygen, a suitable temperature and water.



In which tubes would the seeds germinate?

- A tube 2 only
- B tubes 1 + 2 only
- C tubes 2 + 3 only
- D tubes 2 + 4 only

12 The table gives information about a human sperm and a human egg.

Which information is correct?

	sperm		egg	
	where formed	chromosome number	where formed	chromosome number
<b>A</b>	ovary	23	testis	23
<b>B</b>	testis	46	ovary	46
<b>C</b>	ovary	46	testis	46
<b>D</b>	testis	23	ovary	23

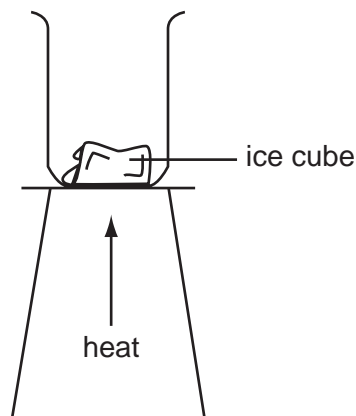
13 An example of a food chain is shown.

large water plants → small fish → large fish → decomposers

What is the source of energy for the large water plants in this food chain?

- A** decomposers
- B** sunlight
- C** wastes from the small fish
- D** water

14 An ice cube is gently warmed as shown.



Which process is taking place?

- A** decomposition
- B** dissolving
- C** distillation
- D** melting

- 15 Which words correctly complete gaps 1, 2 and 3 below?

Molecules of .....1..... join together to form .....2..... that is thermoplastic and .....3..... on heating.

	gap 1	gap 2	gap 3
<b>A</b>	a monomer	a polymer	hardens
<b>B</b>	a monomer	a polymer	softens
<b>C</b>	a polymer	a monomer	hardens
<b>D</b>	a polymer	a monomer	softens

- 16 The structure of sugar obtained from plants may be simplified as shown.



Compound **X**, also obtained from plants, has the following structure.



What could **X** be?

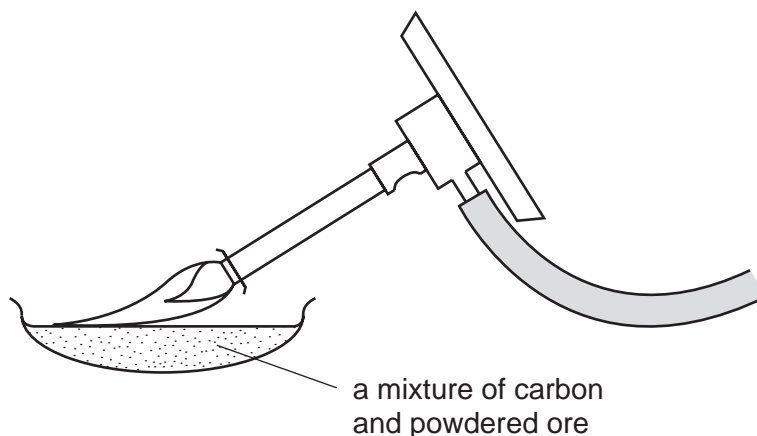
	protein	starch
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

- 17 A solid has a giant structure. It does not conduct electricity but does so when it is dissolved in water.

What could the solid be?

	copper(II) chloride	graphite
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

- 18 The diagram shows a metal being extracted from its powdered ore.



What happens to the ore in this reaction?

- A it burns
  - B it decomposes
  - C it is oxidised
  - D it is reduced
- 19 Limestone and common salt are important minerals.
- For which process are **both** minerals suitable starting materials?
- A manufacture of alkalis
  - B manufacture of chlorine
  - C manufacture of fertilisers
  - D manufacture of hydrogen
- 20 A man spills ink on his polyester shirt.

The table shows the solubility of ink and of polyester in four solvents.

Which solvent should be used to remove the ink?

solvent	ink	polyester
<b>A</b>	insoluble	insoluble
<b>B</b>	insoluble	soluble
<b>C</b>	soluble	insoluble
<b>D</b>	soluble	soluble



21 The table shows the pH values of four solutions.

Which solution produces an exothermic reaction when mixed with a dilute acid?

solution	pH
<b>A</b>	10
<b>B</b>	7
<b>C</b>	4
<b>D</b>	1

22 Which types of change take place during the weathering of rock?

	chemical change	physical change
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

23 Nitrogen from the air is used to manufacture the fertiliser ammonium sulphate.

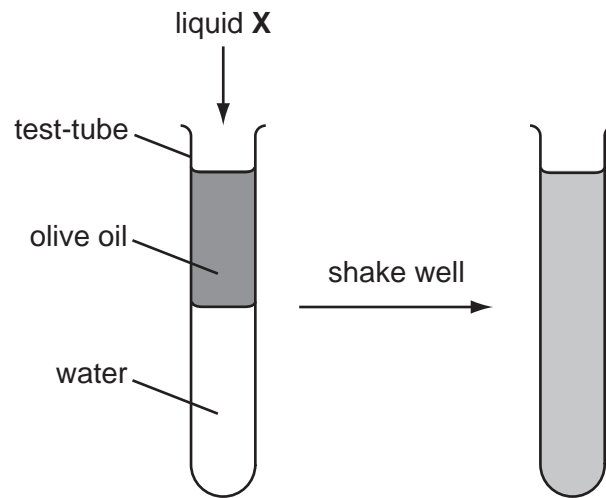
Why is a catalyst needed during this process?

- A** Nitrogen from the air is not pure.
- B** Nitrogen is a gas at room temperature.
- C** Nitrogen is a non-metallic element.
- D** Nitrogen reacts slowly.

24 Why is an analgesic used?

- A** to decrease acidity in the stomach
- B** to extract dye from a plant
- C** to make an emulsion
- D** to relieve pain

- 25 An experiment using olive oil and water is shown. Liquid X is added and the contents of the test-tube are shaken.

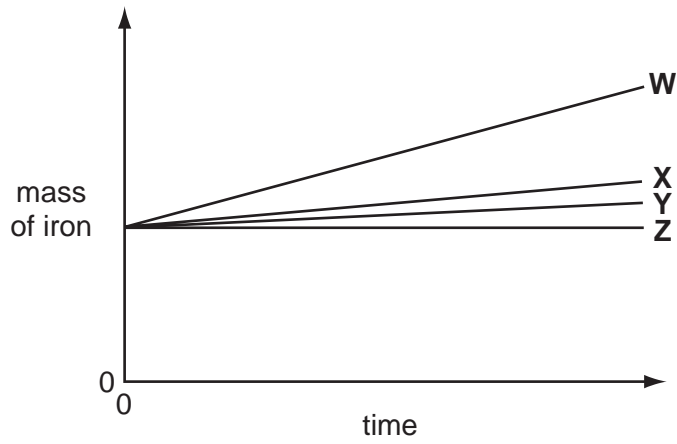


How is liquid X described?

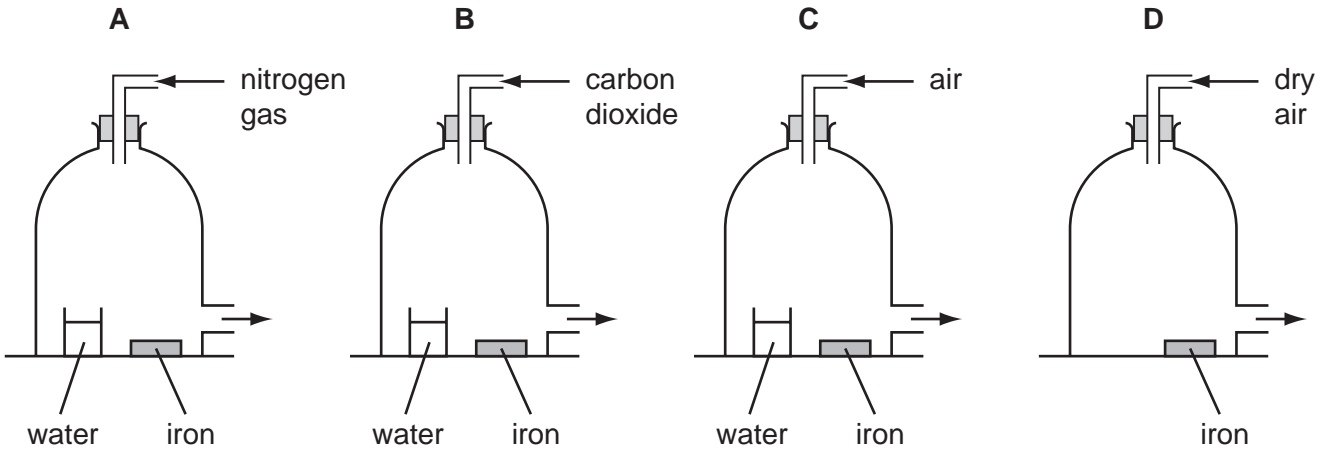
- A a colloid
- B an emulsifier
- C a gel
- D a sol

26 In an experiment on rusting, pieces of iron were kept under four different conditions and weighed at regular intervals.

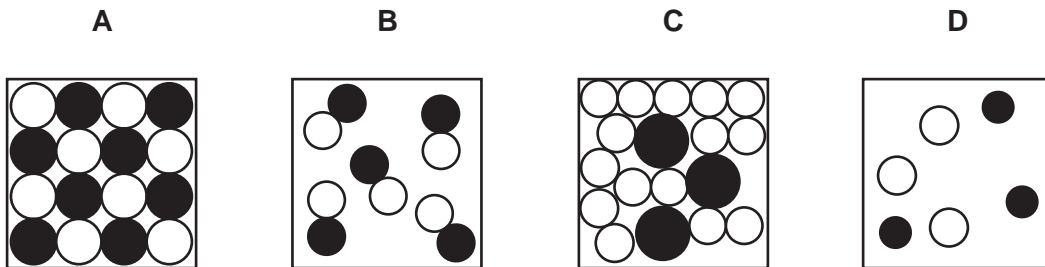
The graph shows the four results.



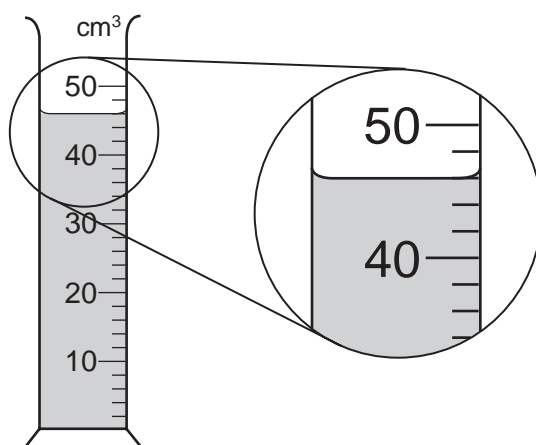
Which experiment would give graph **W**?



27 Which diagram represents an alloy?

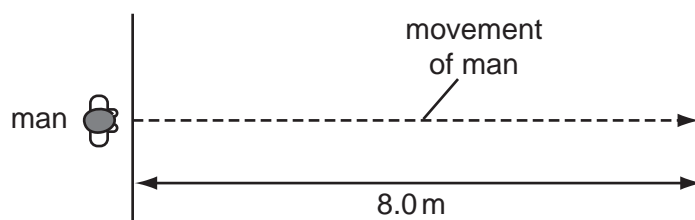


- 28 A measuring cylinder is used to measure the volume of a liquid.



What is the volume of the liquid?

- A  $43 \text{ cm}^3$       B  $46 \text{ cm}^3$       C  $48 \text{ cm}^3$       D  $54 \text{ cm}^3$
- 29 A man crosses a road  $8.0 \text{ m}$  wide at a speed of  $2.0 \text{ m/s}$ .



How long does the man take to cross the road?

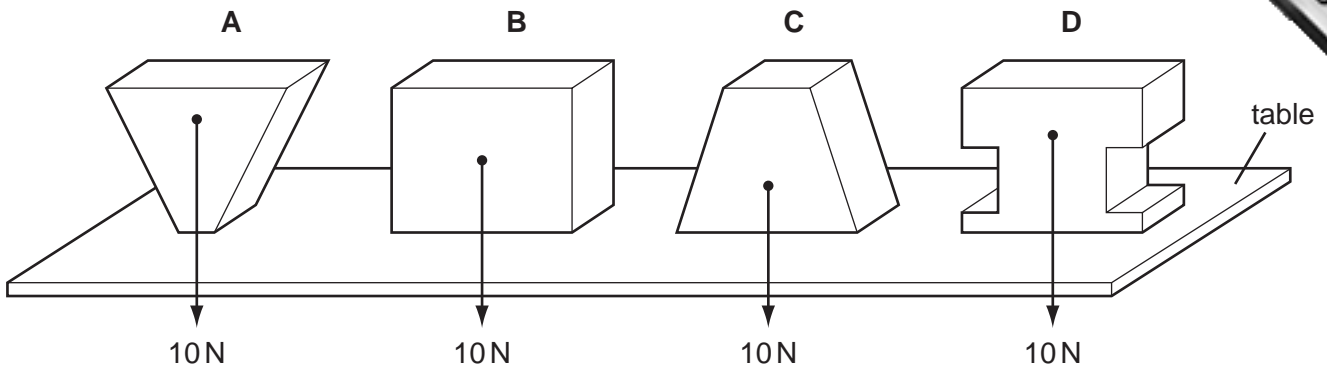
- A  $4.0 \text{ s}$       B  $6.0 \text{ s}$       C  $10 \text{ s}$       D  $16 \text{ s}$
- 30 A sports car has a mass of  $750 \text{ kg}$  and a saloon car has a mass of  $1500 \text{ kg}$ . They are both moving at the same speed.

The sports car has

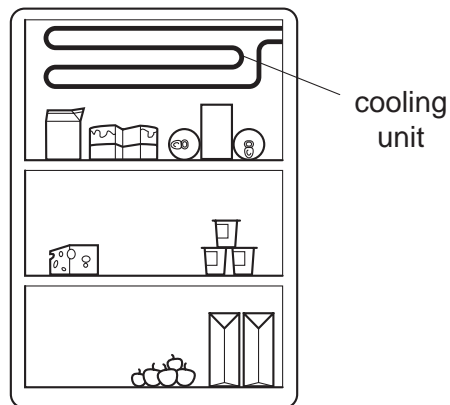
- A half the momentum of the saloon car.  
 B the same momentum as the saloon car.  
 C double the momentum of the saloon car.  
 D four times the momentum of the saloon car.

31 Four blocks, each weighing 10 N, rest on a horizontal table.

Which block applies the greatest pressure on the table?



32 The diagram shows a cooling unit in a refrigerator.



Why is the cooling unit placed at the top?

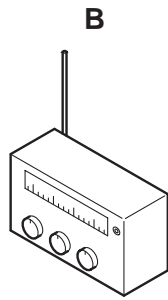
- A Cold air falls and warm air is displaced upwards.
- B Cold air is a bad conductor so heat is not conducted into the refrigerator.
- C Cold air is a good conductor so heat is conducted out of the refrigerator.
- D Cold air stops at the top and so prevents convection.

33 The diagrams show four sources of waves.

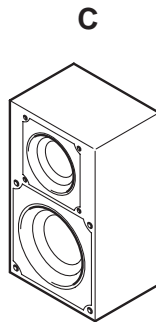
Which source generates longitudinal waves?



stick pushed up  
and down in water



radio  
transmitter

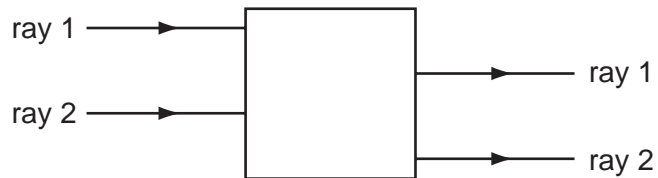


loudspeaker



lamp

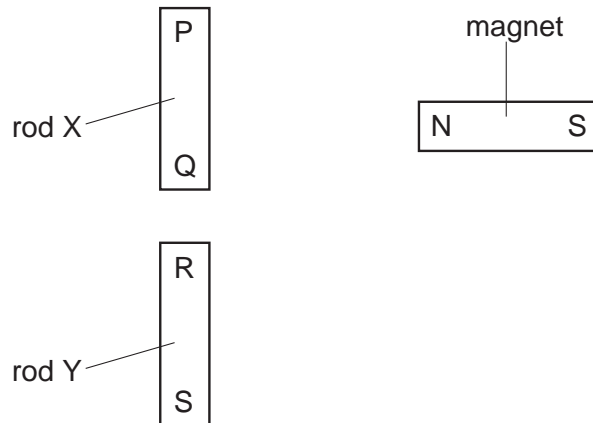
34 Rays of light enter and leave a box.



What could be inside the box to make the rays behave as shown?

- A** a converging lens
- B** a parallel-sided glass block
- C** a plane mirror
- D** a triangular prism

35 Two rods X and Y look the same.



The N pole of a magnet is brought close, in turn, to each end of both rods. The results of these four actions are shown in the table.

end tested	result
P	attraction
Q	attraction
R	attraction
S	repulsion

Which of the rods is a magnet?

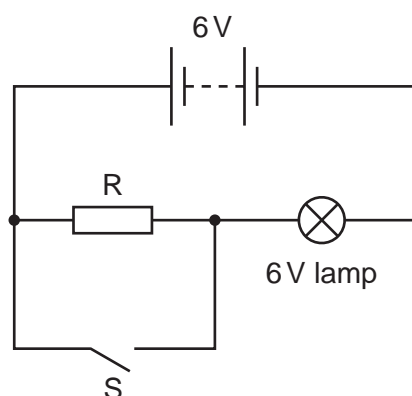
- A neither of the rods
- B both of the rods
- C rod X only
- D rod Y only

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

Which heater has the least resistance?

	voltage / V	current / A
<b>A</b>	110	5.0
<b>B</b>	110	10
<b>C</b>	230	5.0
<b>D</b>	230	10

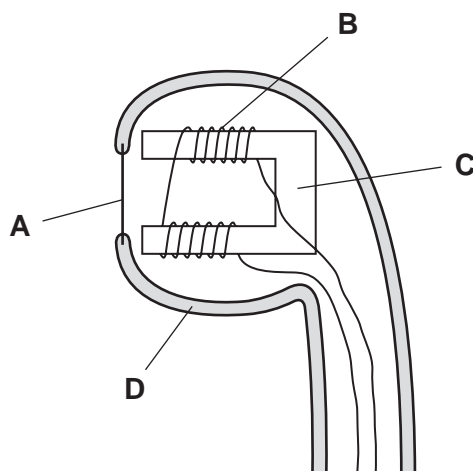
- 37 When the circuit shown is connected with switch S open, the 6 V lamp glows.



What happens to the brightness of the lamp when switch S is closed?

- A It becomes brighter.
  - B It remains the same.
  - C It becomes dimmer.
  - D It goes off.
- 38 The diagram shows the earpiece of a telephone.

Which part of the earpiece moves in order to produce sound?



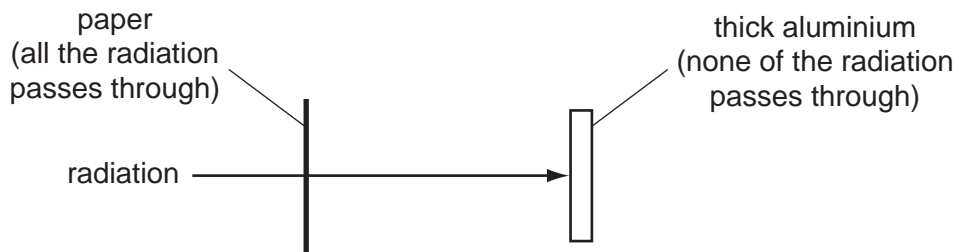
- 39 When light was first used to pass messages between places many kilometres apart, the problem of coding the message had to be solved.

Which of the following was a possible solution?

- A Flash white light on and off.
- B Pass white light through a prism to give a spectrum.
- C Use continuous blue light.
- D Use continuous red light.



- 40 A radioactive source emits radiation which can pass through a sheet of paper but not through thick aluminium.



What does this show about the radiation?

- A It is alpha-particles.
- B It is beta-particles.
- C It is gamma-rays.
- D It is a mixture of alpha-particles and gamma-rays.





**DATA SHEET**  
**The Periodic Table of the Elements**

		Group										
I	II	III	IV	V	VI	VII	O					
		1 <b>H</b> Hydrogen 1										4 <b>He</b> Helium 2
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4											20 <b>Ne</b> Neon 10
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	16 <b>O</b> Oxygen 8	19 <b>F</b> Fluorine 9					35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulphur 16	35.5 <b>Cl</b> Chlorine 17					79 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35					127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53					209 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85
226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85					210 <b>Rn</b> Radon 86	

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

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

**Key**

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

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