

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS
CO-ORDINATED SCIENCES
PAPER 1 Multiple Choice

0654/1

MAY/JUNE SESSION 2002

45 minutes

Additional materials:

- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

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

There are **forty** questions in 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 very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

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 question paper consists of 18 printed pages and 2 blank pages.



1 The table shows features of different animals.

Which animal is a reptile?

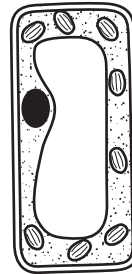
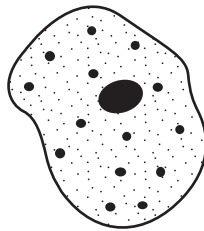
animal	hairy skin	dry, scaly skin	mammary glands
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = feature present

✗ = feature absent

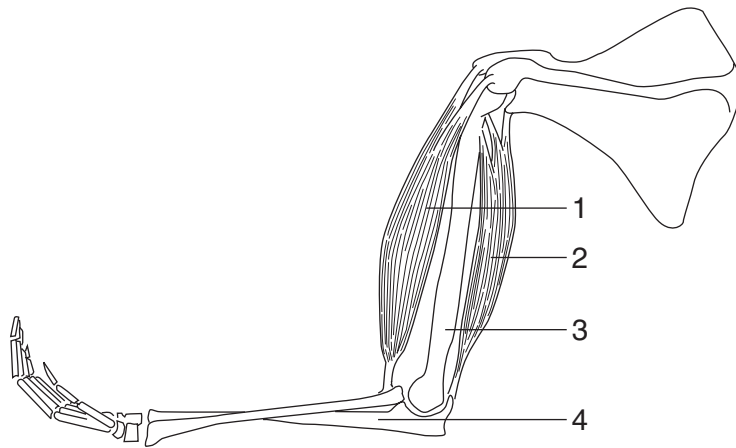
2 The diagram shows two different cells.



Which feature do they both have?

- A** cell membrane
- B** cell wall
- C** central vacuole
- D** chloroplasts

3 The diagram shows bones and muscles in the human arm.

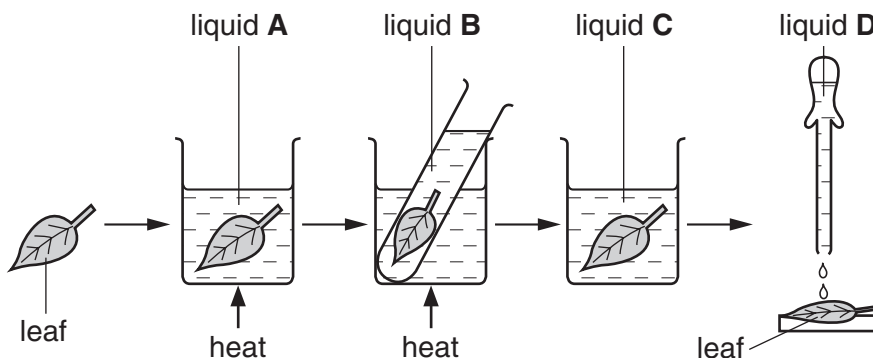


Which identifies the biceps, triceps and ulna?

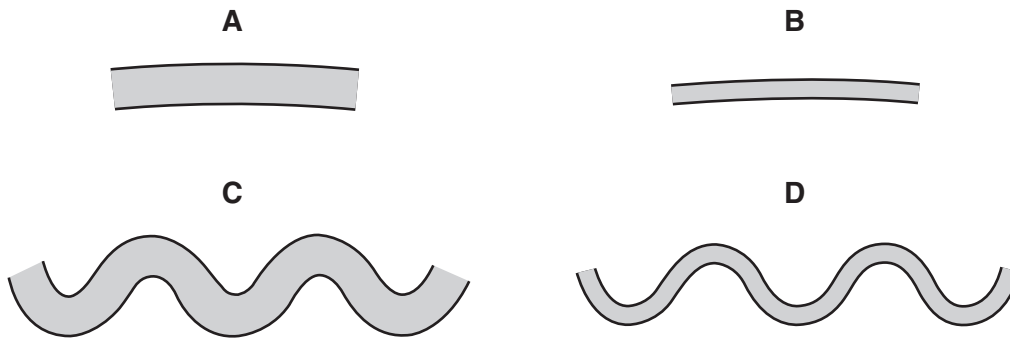
	biceps	triceps	ulna
A	1	2	4
B	1	2	3
C	2	1	4
D	2	1	3

4 The diagram shows the stages in testing a green leaf for starch.

Which liquid is alcohol (methylated spirits)?



- 5 The diagram shows sections through four gaseous exchange surfaces.
Which surface would be the most efficient for the exchange of gases?



- 6 Some liquid is collected from the xylem in a stem.

What is present in the liquid?

- A amino acids
 - B inorganic ions
 - C starch
 - D sugar
- 7 Which substance is broken down to release energy during respiration?
- A carbon dioxide
 - B glucose
 - C oxygen
 - D water

- 8 The photograph shows a girl suffering from a deficiency disease.

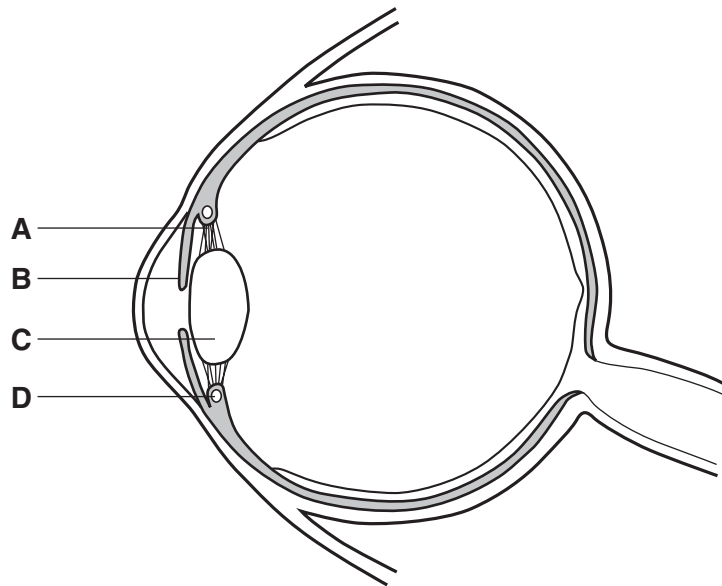


The disease is likely to have been caused by a shortage in the diet of

- A carbohydrate.
 B fat.
 C vitamin C.
 D vitamin D.
- 9 Which factors would be likely to cause the human population of a village to increase?

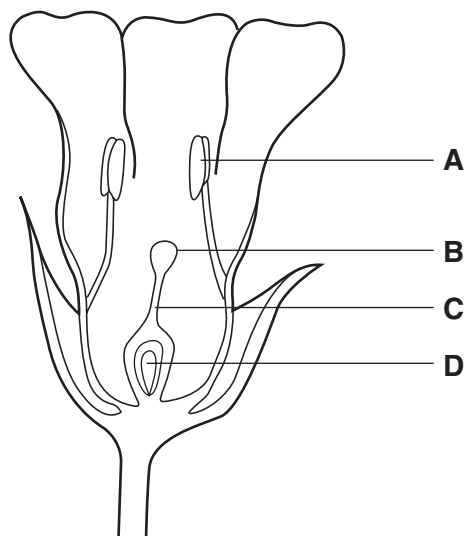
	clean water supply	immunisation of children	spread of HIV (AIDS)
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

10 Which part of the eye contains muscles that change the size of the pupil?

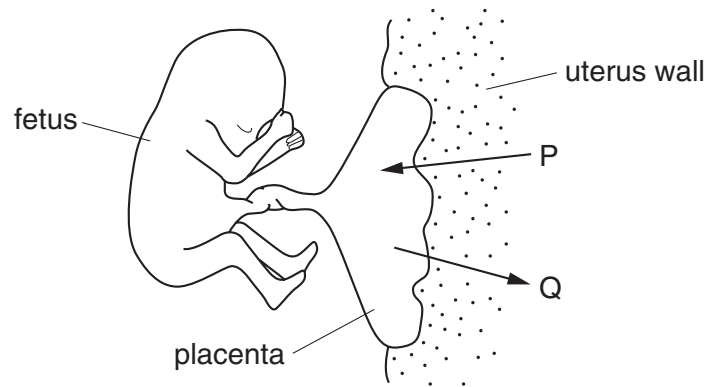


11 The diagram shows the structure of a flower.

Where does fertilisation take place?



12 The diagram shows a human fetus attached by the placenta to the uterus wall of its mother.



Which substances pass in the direction of arrow P and arrow Q?

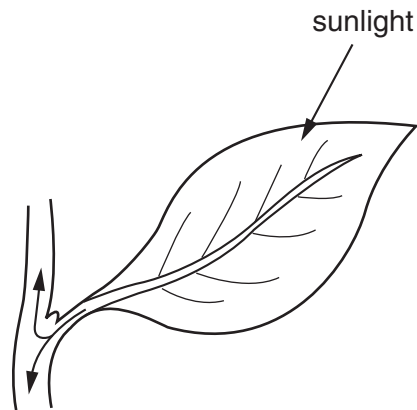
	arrow P	arrow Q
A	carbon dioxide, glucose	oxygen, amino acids
B	carbon dioxide, urea	oxygen, glucose
C	oxygen, glucose	carbon dioxide, urea
D	oxygen, urea	carbon dioxide, amino acids

13 There are 46 chromosomes in the nucleus of a human liver cell.

Which human cell contains half this number of chromosomes in its nucleus?

- A** a fertilised egg cell
- B** a muscle cell
- C** a red blood cell
- D** a sperm cell

14 The diagram shows a leaf attached to the stem of a plant.



What do the arrows represent?

- A the flow of energy
- B the flow of water
- C the movement of oxygen
- D the movement of salts

15 The properties of three substances are shown.

substance	property
X	easy to pour
Y	diffuses to fill all the space available
Z	has a definite shape

What are the states of the substances?

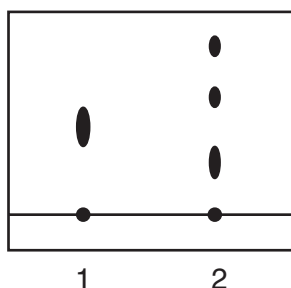
	X	Y	Z
A	gas	gas	liquid
B	gas	liquid	solid
C	liquid	gas	solid
D	liquid	liquid	solid

16 Element **X** forms a basic oxide.

How is **X** described?

	type of element	position in the Periodic Table
A	metal	in a group on the left
B	metal	in a group on the right
C	non-metal	in a group on the left
D	non-metal	in a group on the right

17 Samples of cellulose and protein are broken down into their monomer units. The diagram shows the result of testing the monomers by paper chromatography.



Which chromatograms can be given by cellulose and by protein?

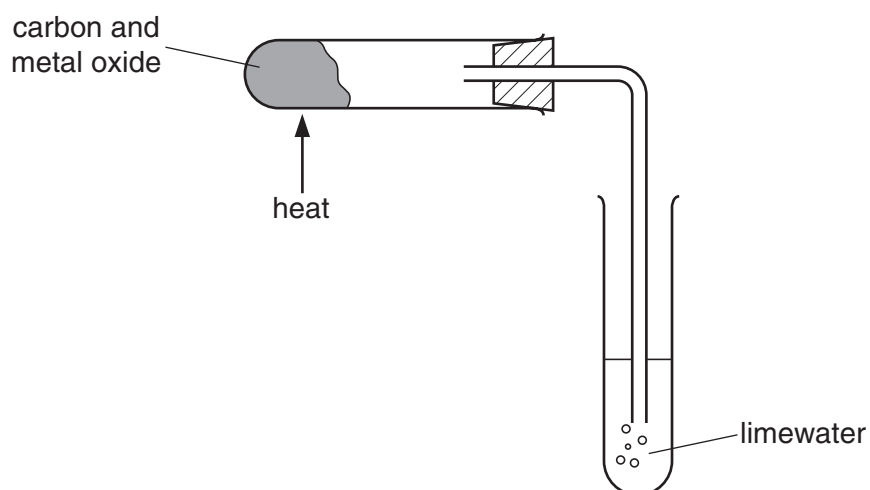
	cellulose	protein
A	1 only	1 only
B	1 only	2 only
C	1 and 2	1 only
D	1 and 2	2 only

18 Crockery is made by baking clay in a fire kiln (furnace).

Why is the lining of the kiln made of a ceramic?

- A** It contains the same material as clay.
- B** It has a low melting point.
- C** It is a good conductor of heat.
- D** It is chemically unreactive when hot.

19 A metal oxide is mixed with carbon and heated as shown.

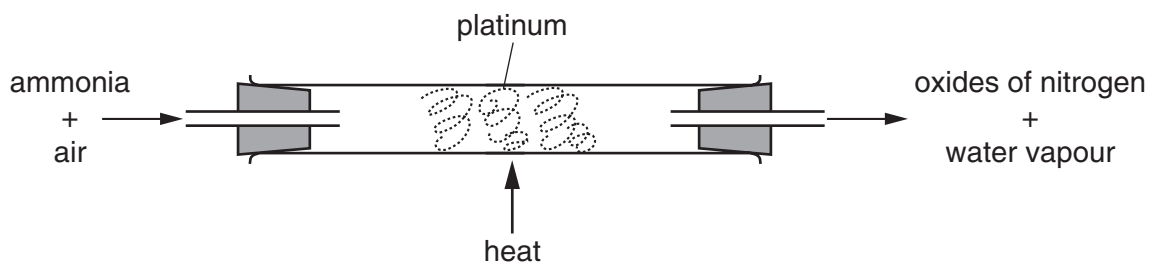


The limewater turns cloudy.

Which term describes what happens to the metal oxide?

- A combustion
 - B neutralisation
 - C oxidation
 - D reduction
- 20 Which process is used to purify copper?
- A chlorination
 - B distillation
 - C electrolysis
 - D filtration
- 21 Which compound is an antacid?
- A calcium carbonate
 - B calcium chloride
 - C calcium iodide
 - D calcium sulphate

22 Ammonia may be oxidised as shown.



The platinum remains chemically unchanged at the end of the reaction.

What is the reason for using platinum?

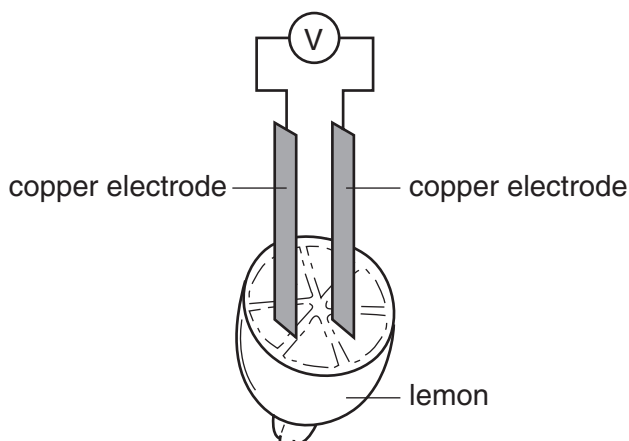
- A to absorb the heat from the reaction
 - B to increase the rate of the reaction
 - C to neutralise the ammonia
 - D to filter out oxygen from the air
- 23 Which substance is an emulsion?
- A butter
 - B fog
 - C olive oil
 - D smoke
- 24 Fire extinguishers often contain carbon dioxide.

Why can carbon dioxide be used for putting out fires?

- A It contains oxygen.
- B It is an acidic gas.
- C It is formed when fuels burn.
- D It prevents air reaching the fire.

25 A student uses the apparatus shown to investigate cells.

The voltmeter reading is zero.



Which electrodes should be replaced to produce a change in the reading of the voltmeter?

- A **one** copper electrode by poly(ethene)
- B **one** copper electrode by zinc
- C **both** copper electrodes by poly(ethene)
- D **both** copper electrodes by zinc

26 Methane is a fuel formed by the decay of waste materials.

Which pollutants may be produced when methane burns?

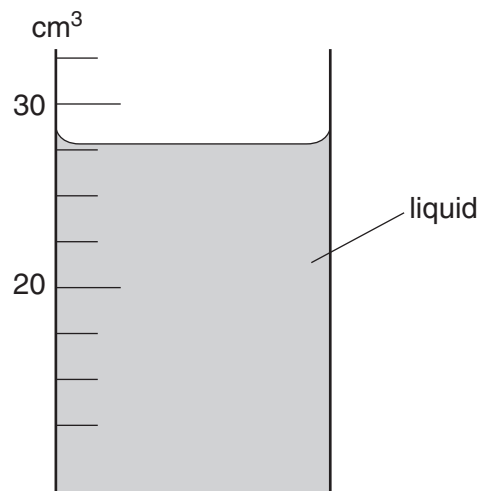
	carbon monoxide	sulphur dioxide	nitrogen oxides
A	yes	yes	no
B	yes	no	no
C	no	yes	yes
D	no	no	yes

27 An element X has a high melting point and its oxide, X_2O_3 , is coloured.

How are X and X_2O_3 described?

- | | X | X_2O_3 |
|----------|------------------|----------|
| A | transition metal | acidic |
| B | transition metal | basic |
| C | non-metal | acidic |
| D | non-metal | basic |

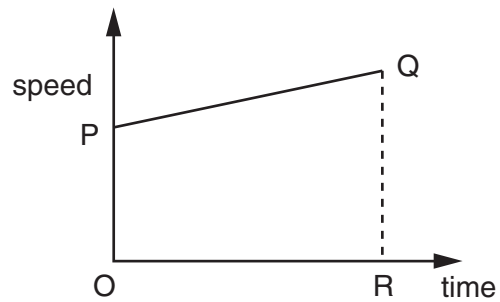
28 The diagram shows the level of liquid in a measuring cylinder.



What is the volume of the liquid?

- A** 24 cm³ **B** 28 cm³ **C** 29 cm³ **D** 32 cm³

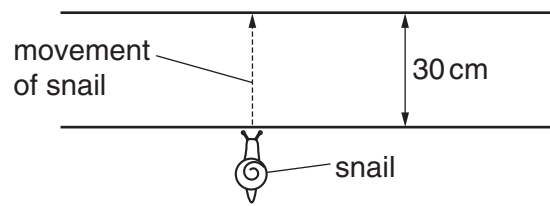
29 The graph shows how the speed of a car changes with time.



Which of the following gives the distance travelled in time interval OR?

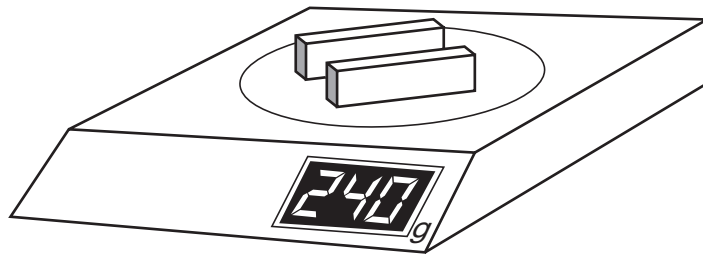
- A** the area OPQR
B the length PQ
C the length (QR – PO)
D the ratio QR/PO

- 30 A snail crosses a garden path 30 cm wide at a speed of 0.2 cm/s.



How long does the snail take?

- A 0.0067 s B 6.0 s C 15 s D 150 s
- 31 A shop-keeper places two identical blocks of cheese on a set of scales and notices that their combined mass is 240 g. Each block measures 2.0 cm x 5.0 cm x 10.0 cm.



What is the density of the cheese?

- A 0.42 g/cm³ B 0.83 g/cm³ C 1.2 g/cm³ D 2.4 g/cm³
- 32 The table shows the length of a wire as the load on it is increased.

load/N	0	10	20	30
length/cm	50.0	52.1	54.1	56.3

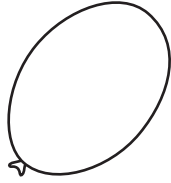
Which subtraction should be made to find the extension caused by the 20 N load?

- A 54.1 cm – 0 cm
 B 54.1 cm – 50.0 cm
 C 54.1 cm – 52.1 cm
 D 56.3 cm – 54.1 cm

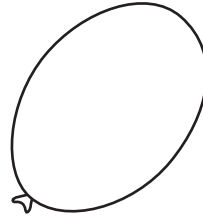
33 The size of a balloon increases when the pressure inside it increases.

The balloon gets bigger when it is left in the heat from the Sun.

cool balloon



hot balloon

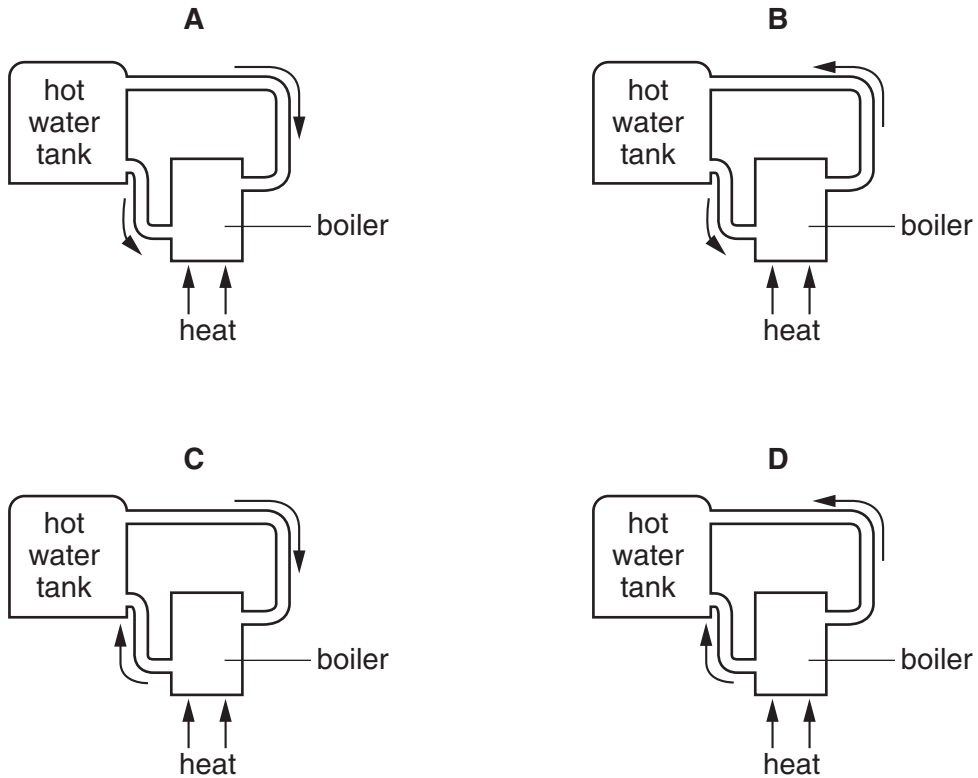


Why does this happen?

- A The air molecules inside the balloon all move outwards when it is heated.
- B The air molecules inside the balloon are bigger when it is heated.
- C The air molecules inside the balloon move more quickly when it is heated.
- D The number of air molecules inside the balloon increases when it is heated.

34 The diagrams show part of a water-heating system which is working by convection.

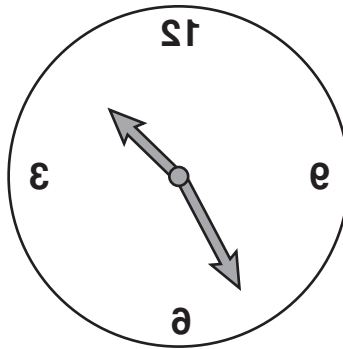
Which diagram shows the most likely flow of water in the system?



- 35 Alpha-particles, beta-particles, gamma-rays and infra-red radiation may all be emitted from a solid.

Which of these are included in the electromagnetic spectrum?

- A alpha-particles and beta-particles
 - B alpha-particles and gamma-rays
 - C beta-particles and infra-red radiation
 - D gamma-rays and infra-red radiation
- 36 The image of a clock face as seen in a plane mirror is shown.

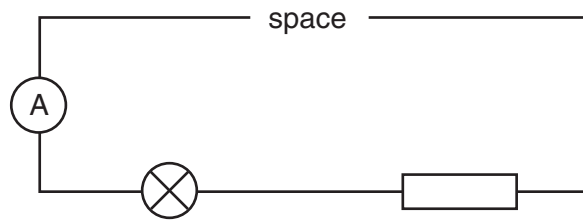


What is the actual time on the clock?

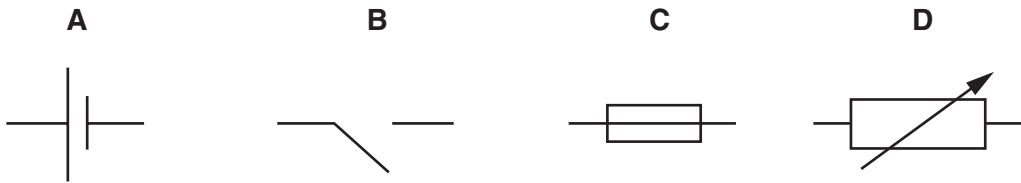
- A 1.25
 - B 1.35
 - C 10.25
 - D 10.35
- 37 Which two electrical quantities are measured in volts?

- A current and e.m.f.
- B current and resistance
- C e.m.f. and potential difference
- D potential difference and resistance

38 The diagram shows an incomplete circuit.



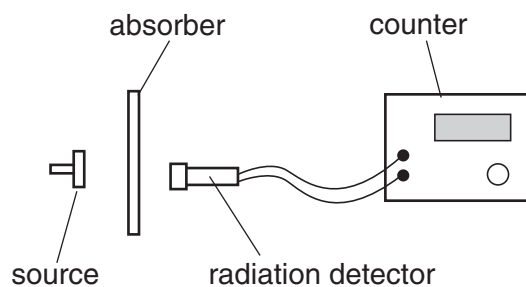
Which component should be connected in the space to make the lamp light?



39 What is a beta-particle?

- A a helium nucleus
- B a high-energy electron
- C four protons
- D two neutrons

40 The diagram shows a radioactivity experiment.



When a piece of paper is used as the absorber, the count rate drops to the background count rate.

What radiation is the source emitting?

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

DATA SHEET
The Periodic Table of the Elements

		Group												
I	II	III	IV	V	VI	VII	O							
		1 H Hydrogen 1										4 He Helium 2		
7 Li Lithium 3	9 Be Beryllium 4											20 Ne Neon 10		
23 Na Sodium 11	24 Mg Magnesium 12											35.5 Cl Chlorine 17		
39 K Potassium 19	40 Ca Calcium 20	51 V Vanadium 23	48 Ti Titanium 22	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	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	91 Zr Zirconium 40	91 Nb Niobium 41	93 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	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	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	210 Po Polonium 84	210 Rn Radon 86
87 Fr Francium	226 Ra Radium	227 Ac Actinium											86 Rn Radon	
												*58-71 Lanthanoid series †90-103 Actinoid series		
												175 Lu Lutetium 71		
												169 Tm Thulium 69		
												167 Er Erbium 68		
												165 Ho Holmium 67		
												162 Dy Dysprosium 66		
												159 Tb Terbium 65		
												157 Gd Gadolinium 64		
												152 Eu Europium 63		
												150 Sm Samarium 62		
												144 Nd Neodymium 60		
												141 Pr Praseodymium 59		
												140 Ce Cerium 58		
												238 U Uranium 92		
												232 Th Thorium 90		
												94 Pu Plutonium		
												95 Am Americium		
												96 Cm Curium		
												97 Bk Berkelium		
												98 Cf Californium		
												99 Es Einsteinium		
												100 Fm Fermium		
												101 Md Mendelevium		
												102 No Nobelium		
												103 Lr Lawrencium		

Key

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

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).