UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/01**

Paper 1 Multiple Choice **May/June 2009**

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 **17** printed pages and **3** blank pages.

1 Which pair of features is found in plant cells but **not** in animal cells?

A	cell membrane	cell sap
B	cell sap	cell wall
C	cell wall	nucleus
D	nucleus	cell membrane

2 Which parts of a plant cell are fully permeable?

	cell surface membrane	cell wall
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

3 The following statements are about enzymes and metabolic reactions.

1 Different metabolic reactions are catalysed by different enzymes.

2 Enzymes are produced only inside living cells.

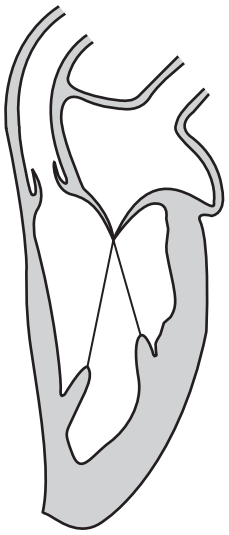
3 Enzymes cannot be re-used.

4 Metabolic reactions take place only inside living cells.

Which two statements are correct?

A 1 and 2 **B** 2 and 3 **C** 3 and 4 **D** 4 and 1

4 The diagram shows **only the left side** of the heart as it appears at one particular stage in a heart-beat.



Which statements describe the left side of the heart at this stage?

1 The semilunar valve is closed.

2 Deoxygenated blood is being pumped to the lungs.

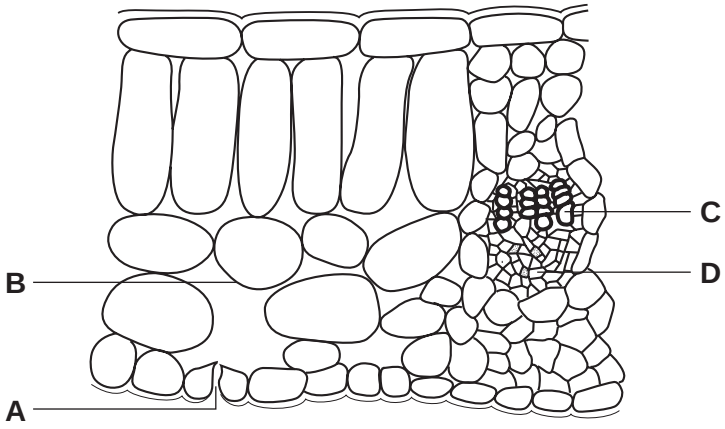
3 Oxygenated blood is entering the atrium.

4 The bicuspid valve is closed.

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

5 The diagram shows a section through a leaf.

Where does evaporation of water take place?



6 The results of tests carried out on four food samples are shown.

sample	Benedict's test	iodine test	biuret test
1	✓	✓	✗
2	✓	✗	✓
3	✗	✓	✗
4	✗	✗	✓

key

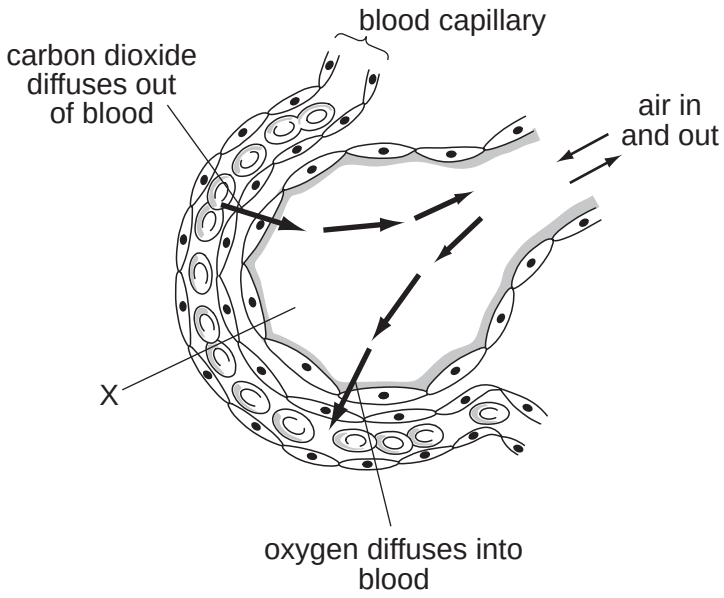
✓ = positive test

✗ = negative test

Which two samples contain protein?

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

7 The diagram shows a section through part of a lung.



What is structure X?

A alveolus

B bronchus

C pleural membrane

D trachea

8 The following statements are about reproduction.

1 Clones grown in different environments will always look exactly alike.

2 Clones possess identical genes.

3 Sexual reproduction produces offspring with different alleles.

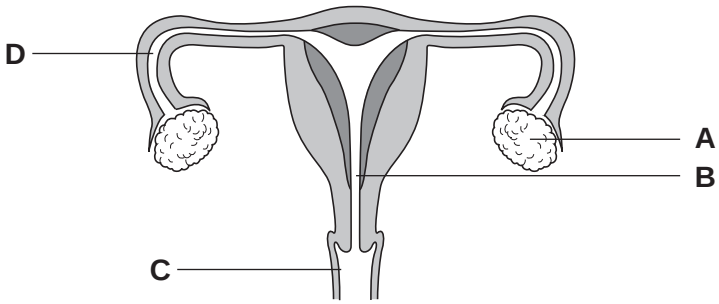
4 When two gametes fuse they form a clone.

Which two statements are correct?

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

9 The diagram shows the human female reproductive system.

Where is the egg fertilised?



10 After fertilisation, which part of a flower develops into a seed?

A egg

B ovary

C ovule

D pollen

11 Ten plants are produced asexually from one parent plant. The diagram shows these plants after they have grown for a few weeks in two separate groups.

What is the explanation for the difference between the two groups of plants?

A All the plants are genetically identical and are growing in the same conditions.

B All the plants are genetically identical but are growing in different conditions.

C The plants are genetically different and are growing in the same conditions.

D The plants are genetically different and are growing in different conditions.

12 Which process takes carbon dioxide out of the air?

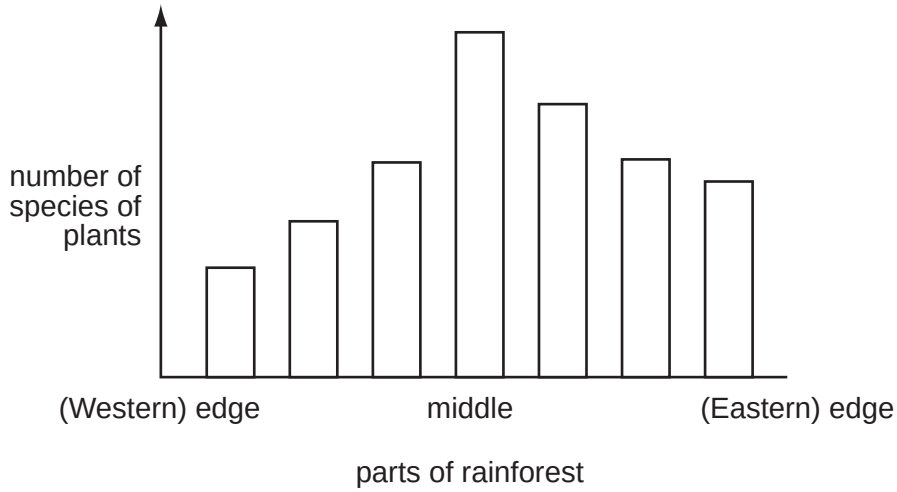
A combustion

B decomposition

C photosynthesis

D respiration

13 The graph shows the number of species of plants in different parts of a rainforest.



Which statement about species diversity is correct?

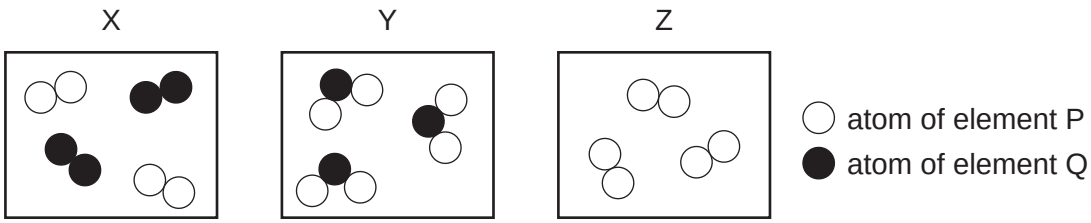
A It is greatest at the edges of the forest.

B It is greatest in the middle of the forest.

C Is the same at both edges of the forest.

D It is the same throughout the forest.

14 Diagrams X, Y and Z represent three different substances.



Which row in the table correctly describes X, Y and Z?

	X	Y	Z
A	compound	element	mixture
B	compound	mixture	element
C	mixture	element	compound
D	mixture	compound	element

15 Two atoms have the symbols $^{40}_{18}X$ and $^{40}_{20}Y$.

It follows that they have the same number of ……1…… and that they form ……2…… bond.

Which words correctly complete gaps 1 and 2?

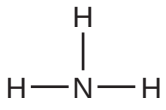
	1	2
A	neutrons	an ionic
B	neutrons	no
C	nucleons	an ionic
D	nucleons	no

16 Which diagrams of the structures of nitrogen and ammonia are correct?

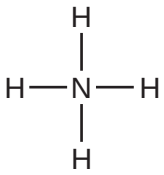
W

X

Y



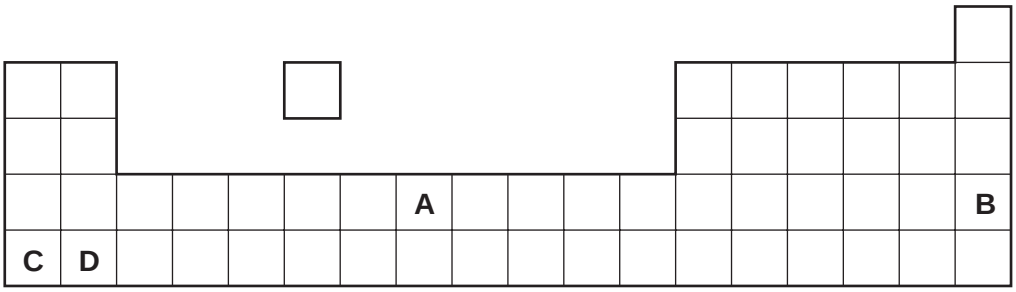
Z



A W and Y **B** W and Z **C** X and Y **D** X and Z

17 The positions of four elements are shown in the outline of the Periodic Table.

Which element has a high melting point and forms coloured compounds?

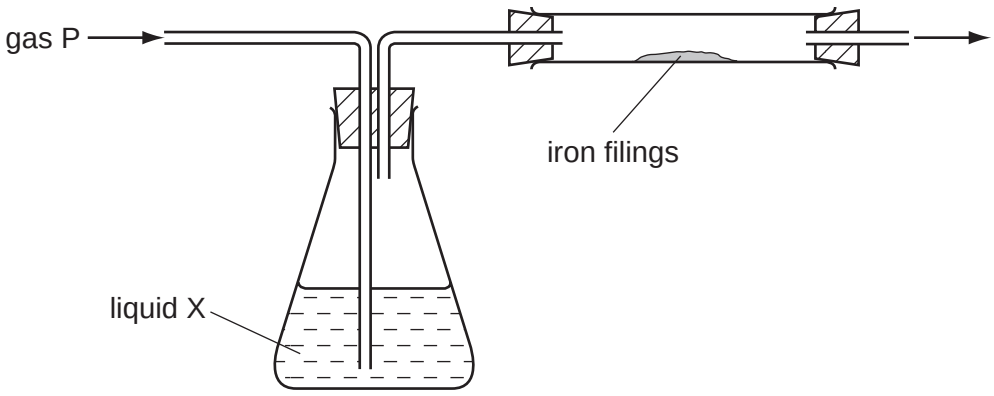


18 A molecule of phosphoric acid contains three hydrogen atoms, one phosphorus atom and four oxygen atoms.

What is the correct formula for this molecule?

A $3HP_4O$ **B** $3HPO_4$ **C** H_3PO_4 **D** $H_3(PO)_4$

19 The diagram shows apparatus in which gas P can be passed through liquid X and th… filings.



Four experiments, each using a different gas P and a different liquid X, are carried out.

In which experiment do the iron filings rust?

	gas P	liquid X
A	nitrogen	concentrated sulfuric acid (a drying agent)
B	nitrogen	water
C	oxygen	concentrated sulfuric acid (a drying agent)
D	oxygen	water

20 A firework gives a bright flame in which yellow and red colours are seen.

Which two metals are present in the firework?

A calcium and copper

B copper and potassium

C potassium and sodium

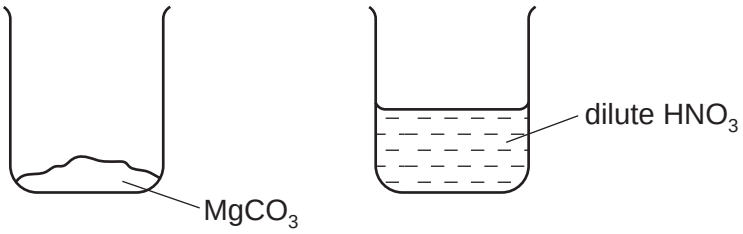
D sodium and calcium

21 Polluted air contains toxic oxides of the elements carbon, C, and sulfur, S, emitted from car exhausts.

Which row in the table is correct?

	toxic oxide is acidic	toxic oxide formula is XO
A	C only	C only
B	C only	S only
C	S only	C only
D	S only	S only

22 The contents of the labelled beakers shown are mixed.



Which salt is formed?

A magnesium nitrate

B magnesium sulfate

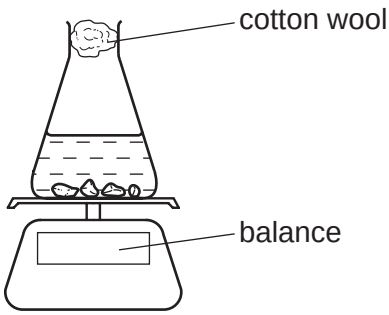
C manganese nitrate

D manganese sulfate

23 Marble chips react with dilute hydrochloric acid as shown.

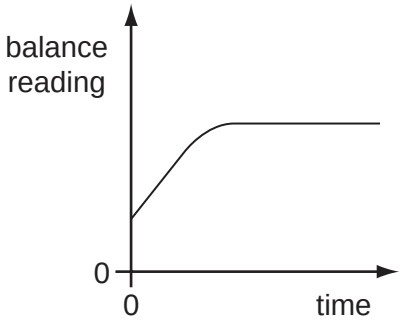
$$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)$$

The progress of this reaction was followed using the apparatus shown.

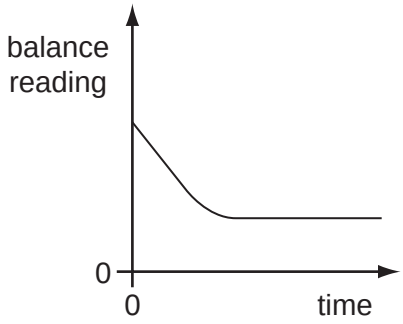


Which graph shows the results of this experiment?

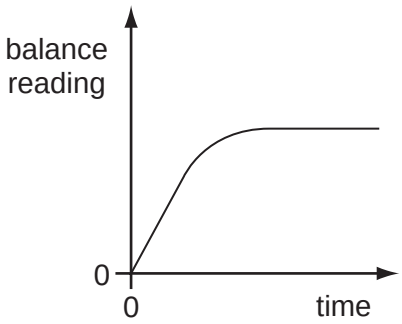
A



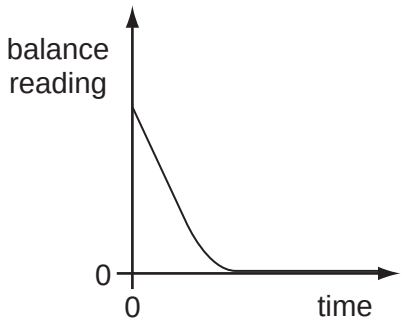
B



C



D



24 Testing for the gases chlorine, hydrogen and oxygen requires different methods.

For which gases is a splint used?

	Cl_2	H_2	O_2
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

25 Which equation shows the complete combustion of a hydrocarbon?

A $C_2H_4 + 2O_2 \rightarrow 2CO + 2H_2O$

B $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$

C $C_2H_6O + 2O_2 \rightarrow 2CO + 3H_2O$

D $C_2H_6O + 3O_2 \rightarrow 2CO_2 + 3H_2O$

26 How can the structure of a plastic be described?

A a mixture of ions

B a mixture of long chain molecules

C a mixture of atoms of metals

D a mixture of small hydrocarbon molecules

27 Which property of the compounds in crude oil is used to separate the oil into useful fractions?

A boiling point

B density

C melting point

D solubility

28 A car travels 100 km. The highest speed of the car is 90 km/h, and the lowest speed is 30 km/h. The journey takes two hours.

What is the average speed for the journey?

A 30 km / h **B** 50 km / h **C** 60 km / h **D** 90 km / h

29 Which items of apparatus are required to determine the density of a liquid?

A balance and measuring cylinder

B balance and thermometer

C metre rule and measuring cylinder

D metre rule and thermometer

30 Which property of an object **cannot** be changed by a force?

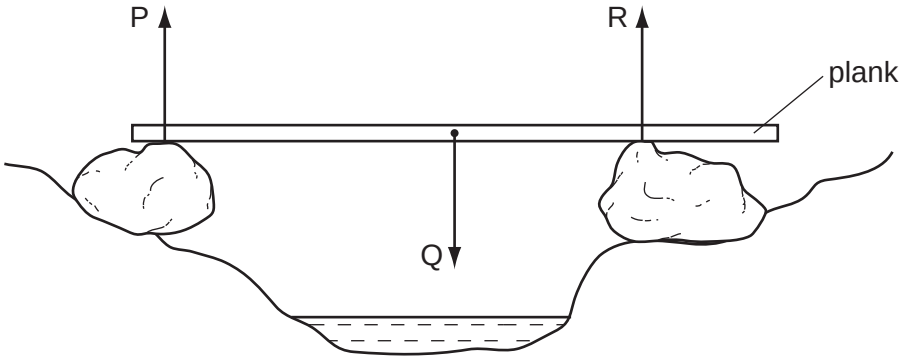
A its mass

B its motion

C its shape

D its size

31 A wooden plank rests in equilibrium on two boulders on opposite sides of a narrow st... forces of size P, Q and R act on the plank.



How are the sizes of the forces related?

A P + Q = R

B P + R = Q

C P = Q = R

D P = Q + R

32 Electricity can be obtained from different energy resources.

Which energy resource is used to obtain electricity without producing heat to boil water?

A coal

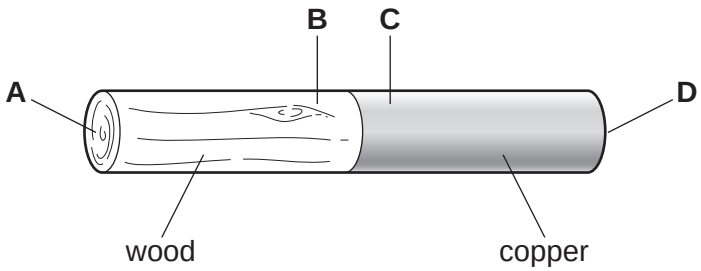
B gas

C hydroelectric

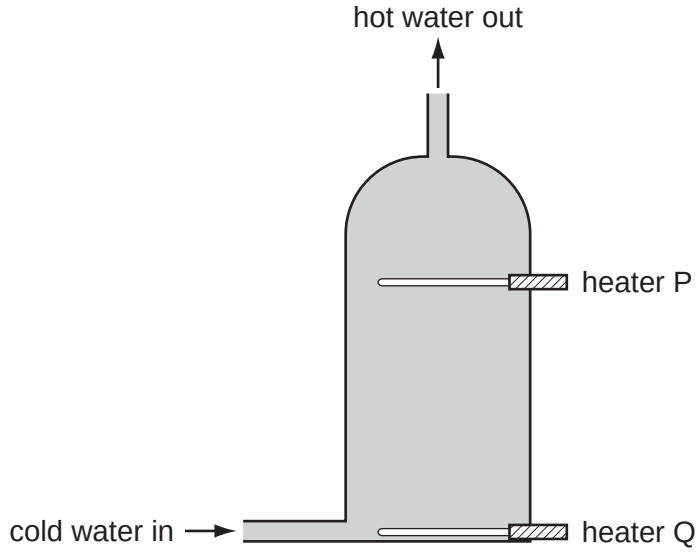
D nuclear

33 A rod is made up of copper and wood joined together.

After the rod is heated at the join in the centre for about a minute, where would the lowest temperature be?



34 A hot water tank is fitted with two identical heaters P and Q. Heater P is two thirds o… the tank and heater Q is at the very bottom. The tank is full of cold water.



When only heater Q is switched on, it takes a very long time to heat the tank of water to the required temperature of 60 °C.

What happens to the tank of cold water if only heater P is switched on?

A All the water reaches 60 °C in less time than before.

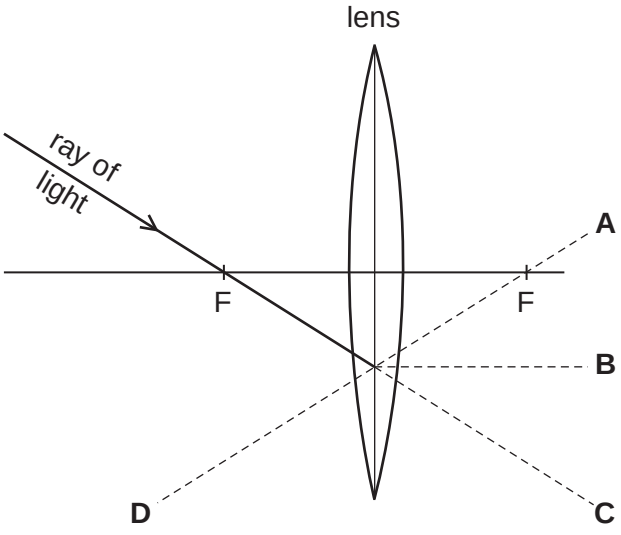
B All the water reaches 60 °C in the same time as before.

C The bottom two thirds of the water reaches 60 °C in two thirds of the original time

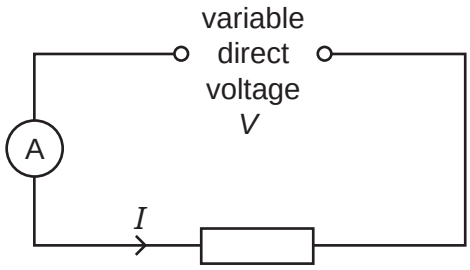
D The top one third of the water reaches 60 °C in one third of the original time.

35 The diagram shows the path of a ray of light passing through the principal focus F of a lens.

Which broken line shows the direction of the ray after it leaves the lens?

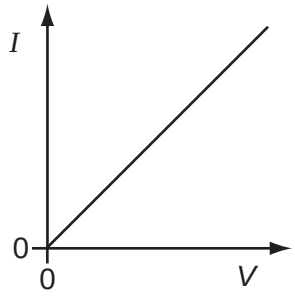


36 Using the circuit shown, the current I is found for various voltages V. The temper… resistor does not change.

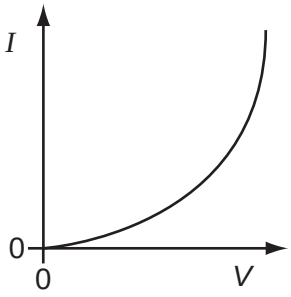


Which graph shows the results obtained?

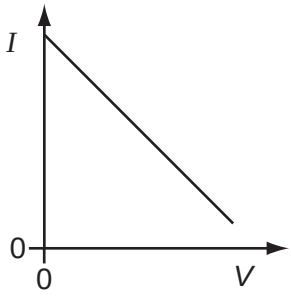
A



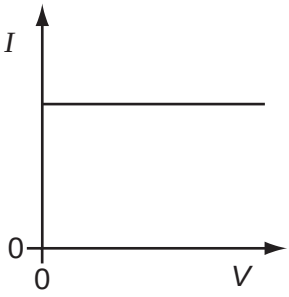
B



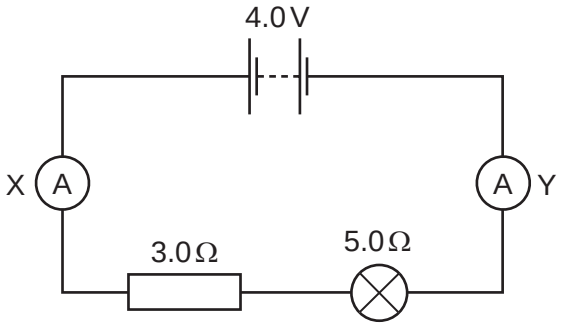
C



D



37 In the circuit shown, ammeter X reads 0.5 A.

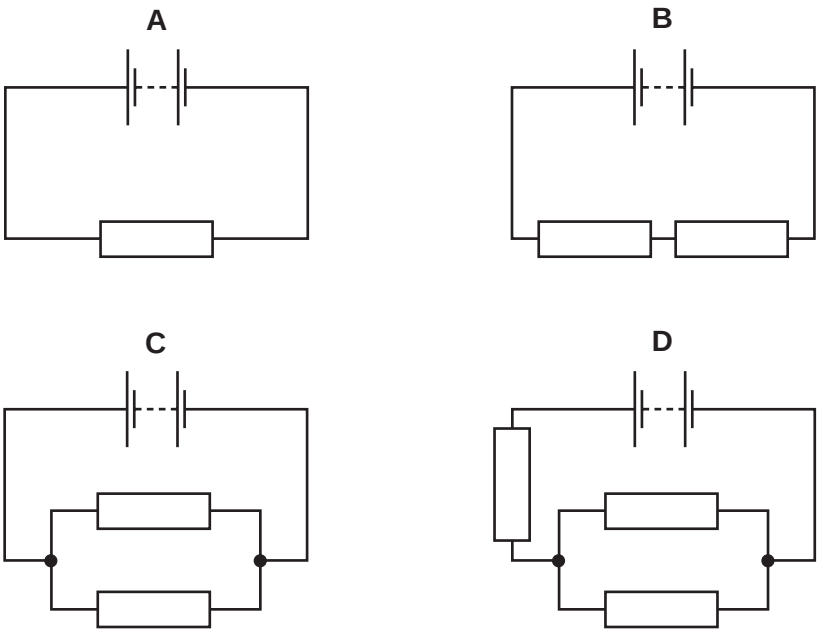


What does ammeter Y read?

A 0 **B** 0.5 A **C** 3.5 A **D** 4.0 A

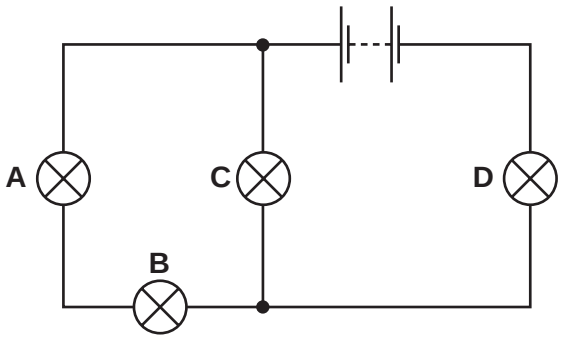
38 In the circuits shown, all the resistors are identical.

Which circuit has the **least** resistance?

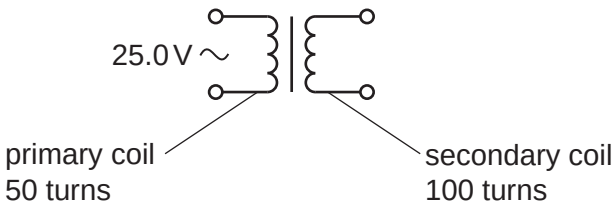


39 In the circuit below, one of the lamps breaks, causing all the other lamps to go out.

Which lamp breaks?



40 A transformer has 50 turns on its primary coil and 100 turns on its secondary coil. An alternating voltage of 25.0 V is connected across the primary coil.



What is the voltage across the secondary coil?

A 12.5 V **B** 50.0 V **C** 175 V **D** 200 V

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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 Sulfur 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 Radius 88	227 Ac Actinium 89 †															

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

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	

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.).