UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/01**

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)

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.

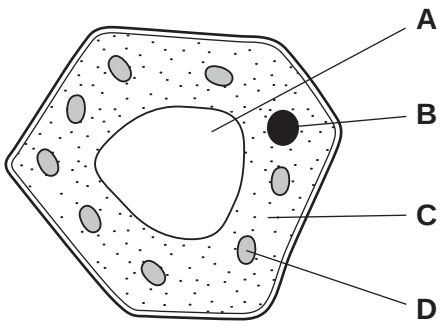
Read the instructions on the Answer Sheet very carefully.

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.

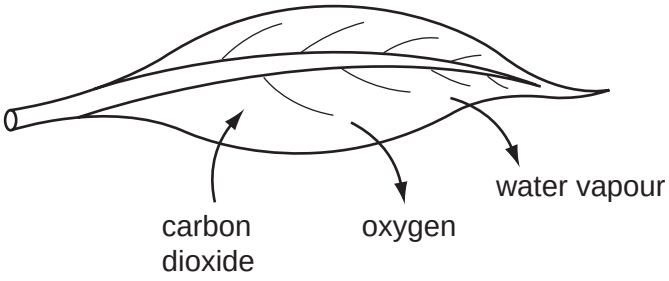
This document consists of **18** printed pages and **2** blank pages.

1 The diagram shows a mesophyll cell from a green plant.

Where is the cell's DNA found?



2 The diagram shows a leaf in sunlight and some of the substances that diffuse into and out of it.



Which of the following has a higher concentration outside the leaf than inside the leaf?

A carbon dioxide only

B carbon dioxide and oxygen

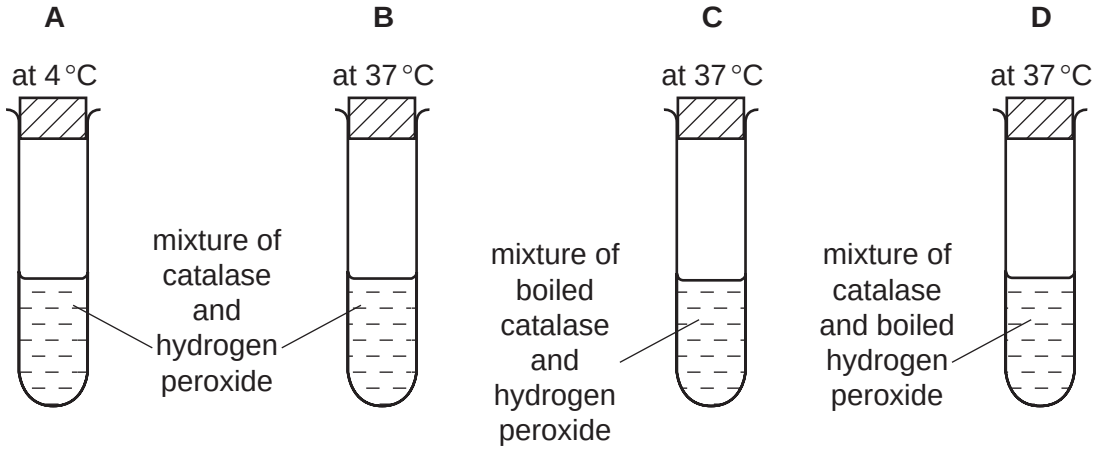
C oxygen and water

D water vapour only

3 The diagrams show an experiment on enzyme activity.

The test-tubes contain equal volumes of solutions of catalase and hydrogen peroxide.

In which test-tube does the enzyme fail to work because it has been denatured?



4 In which way do plants usually take in water from their surroundings?

A as liquid through stomata

B as liquid through root hairs

C as vapour through stomata

D as vapour through root hairs

5 A series of tests on a white liquid gave the following results.

test	result of test
Benedict's	an orange-red colour
biuret	a pale blue colour
iodine	a blue-black colour

What did the white liquid contain?

A protein and starch only

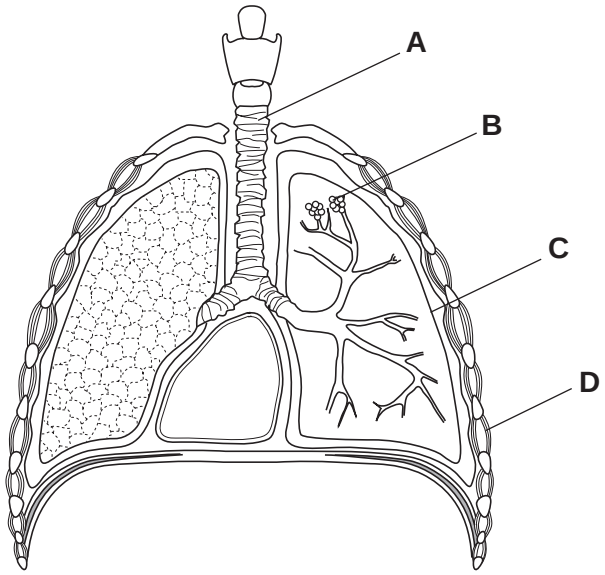
B protein and reducing sugar only

C protein, reducing sugar and starch

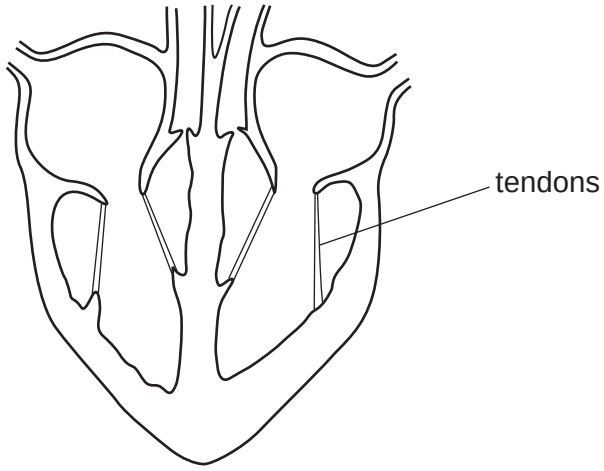
D reducing sugar and starch only

6 The diagram shows the thorax.

Which part has a lining containing goblet cells?



7 The diagram shows a section through the human heart.



Which structures are joined by the tendons?

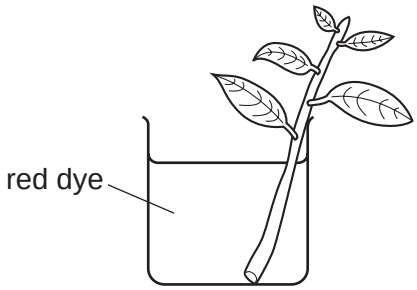
A atrium wall and septum

B atrium wall and valve

C septum and ventricle wall

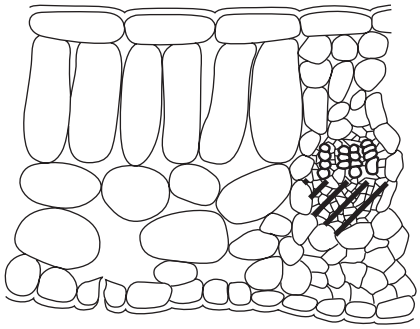
D valve and ventricle wall

8 A plant shoot is left for several hours in a solution of red dye.

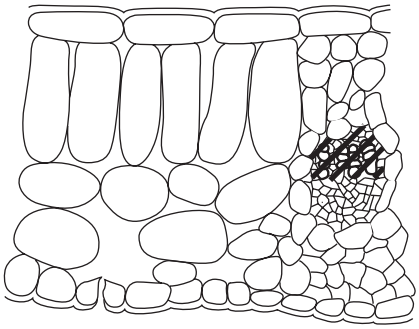


What is seen when a section is cut through a leaf and observed under a microscope?

A



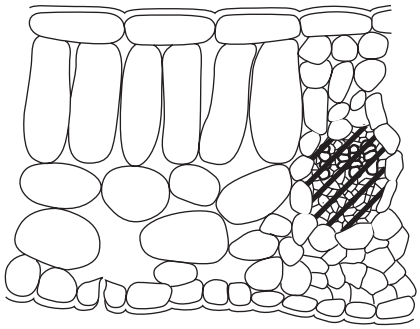
B



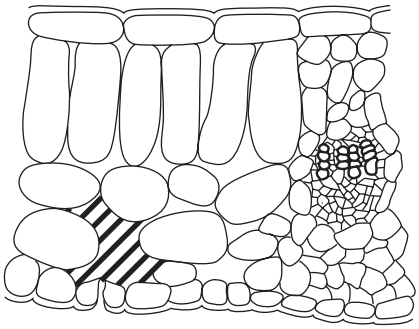
key

red area

C



D



9 Which sequence shows the path of a signal through the nervous system when a person touches a hot object?

A central nervous system → effector → receptor

B effector → central nervous system → receptor

C effector → receptor → central nervous system

D receptor → central nervous system → effector

10 Which event that happens in the ovary of a flower starts seed formation?

A conservation

B fertilisation

C germination

D pollination

11 Which is **not** responsible for variation in characteristics in a plant?

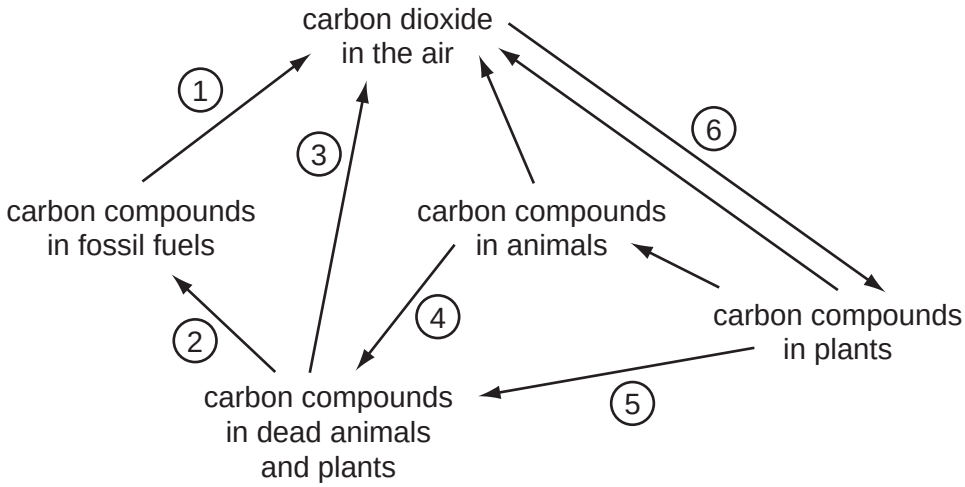
A chromosomes

B cloning

C environment

D genes

12 The diagram shows part of the carbon cycle.



During which stage in the cycle will oxygen be added to the air?

A 1 **B** 3 **C** 5 **D** 6

13 Which are possible harmful effects of deforestation?

	global warming	reduced species diversity	soil erosion
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✗
D	✗	✓	✓

key
✓ = yes
✗ = no

14 The symbol for an atom of neon is $^{20}_{10}Ne$.

Which statement about the atom is correct?

A It contains half as many neutrons as protons.

B It contains twice as many neutrons as protons.

C The number of neutrons equals the number of protons.

D The total number of neutrons and protons is thirty.

15 On heating iron and sulphur together, the mixture starts to glow. The glow then continues even when the heating is stopped.

In this reaction, ……1…… heat is given out and a new ……2…… is formed.

Which words correctly complete gaps 1 and 2?

	1	2
A	no	element
B	no	compound
C	some	element
D	some	compound

16 Which gases have covalent molecules that contain one or more double bonds?

	carbon dioxide	ethene	hydrogen chloride
A	✓	✓	✓
B	✓	✓	✗
C	✗	✓	✓
D	✗	✗	✓

17 What does a word equation show?

	the changes that occur in a reaction	the speed of a reaction
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

18 Which formula contains the most elements?

A NaOH **B** Rb_2S **C** $SiCl_4$ **D** SnO_2

19 Urea, $(NH_2)_2CO$, is used as a fertiliser.

How many atoms or molecules are combined in urea?

A atoms: nitrogen, 1; hydrogen, 2; carbon, 2; oxygen, 2

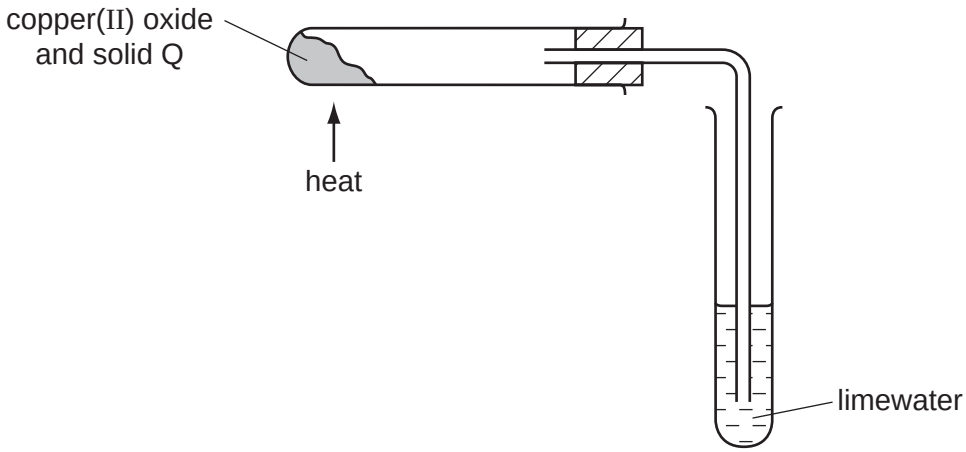
B atoms: nitrogen, 2; hydrogen, 4; carbon, 1; oxygen, 1

C molecules: ammonia, 1; carbon monoxide, 2

D molecules: ammonia, 2; carbon monoxide, 1

20 Copper(II) oxide is mixed with solid Q.

On heating the mixture, a reaction occurs and the limewater turns cloudy.



What is solid Q?

A carbon

B iron

C sulphur

D zinc

21 What is an alloy?

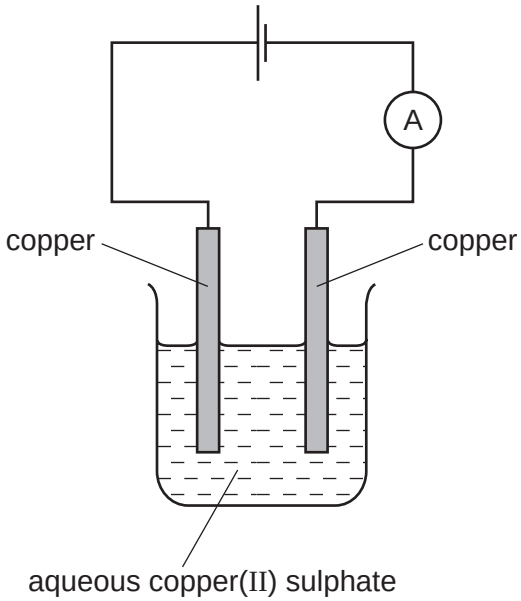
A a compound containing two metallic elements

B a compound containing two non-metallic elements

C a mixture containing two metallic elements

D a mixture containing two non-metallic elements

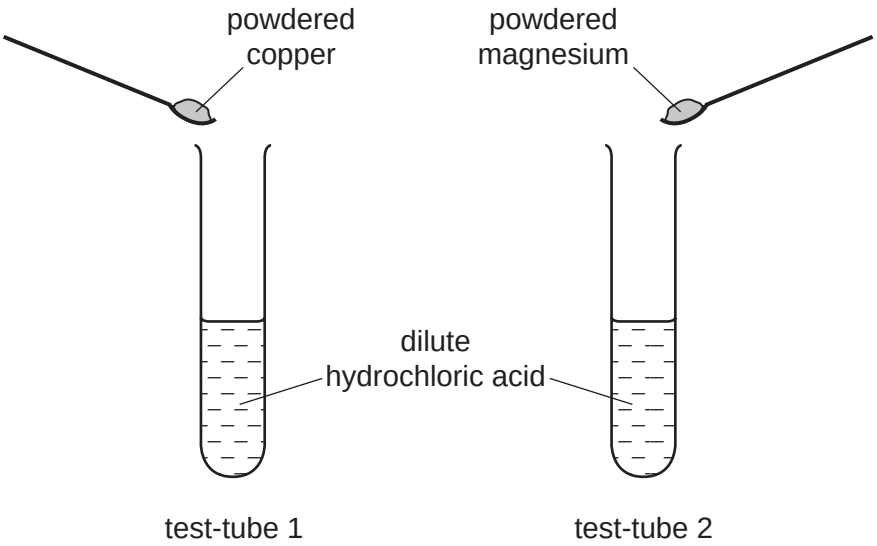
22 Impure copper is purified by electrolysis, as shown.



What is the cathode made of and how does its mass change during the electrolysis?

	the cathode is made of	its mass
A	impure copper	decreases
B	impure copper	increases
C	pure copper	decreases
D	pure copper	increases

23 The diagrams show an experiment.



Each element is added until there is no further reaction. Universal Indicator solution is then added to each test-tube.

What are the colours of the indicator in the two test-tubes?

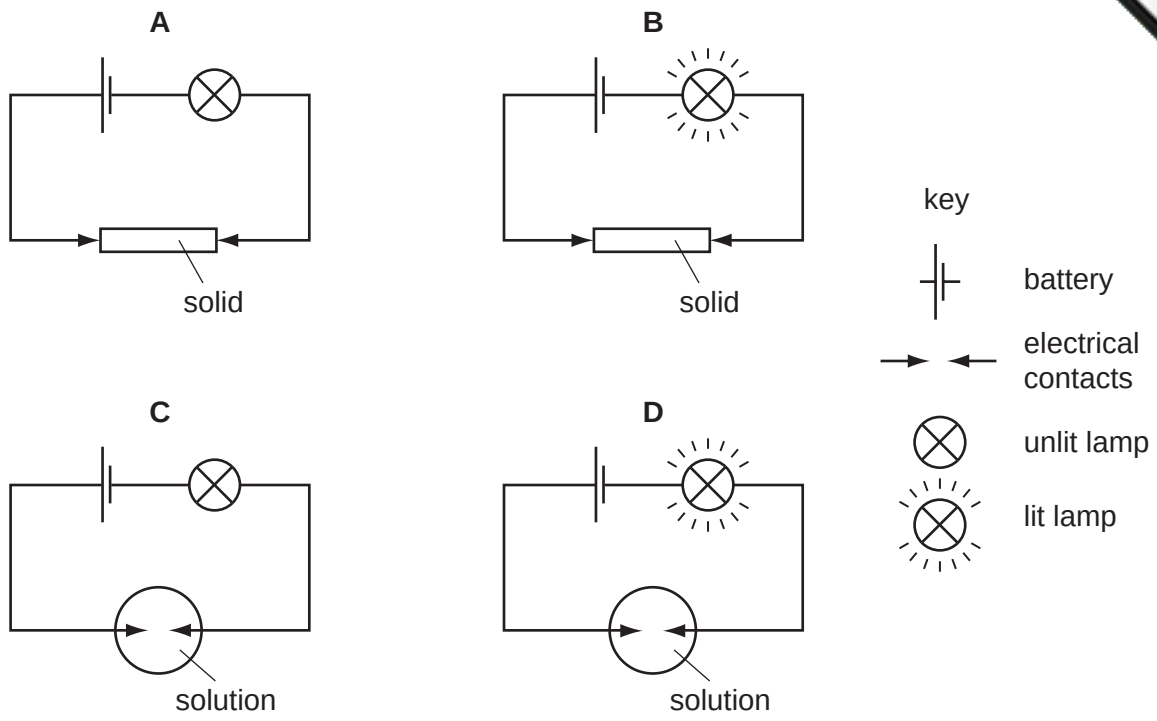
	test-tube 1	test-tube 2
A	blue	green
B	blue	red
C	red	green
D	red	red

24 When a mixture of hydrogen and oxygen is ignited, an explosive reaction occurs and water is formed.

Which terms describe this reaction?

	combustion	redox
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

25 Which diagram shows that an electrolyte is present?



26 Which energy sources burn fossil fuels?

1 a coal-fired power station

2 a nuclear power station

3 an oil-fired power station

A 1 and 2 only

B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3

27 Some plastics have long chain molecules that are made from molecules called X.

The molecules of X are most commonly obtained from Y.

What are X and Y?

	X	Y
A	monomers	coal
B	monomers	oil
C	polymers	coal
D	polymers	oil

28 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.

29 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.

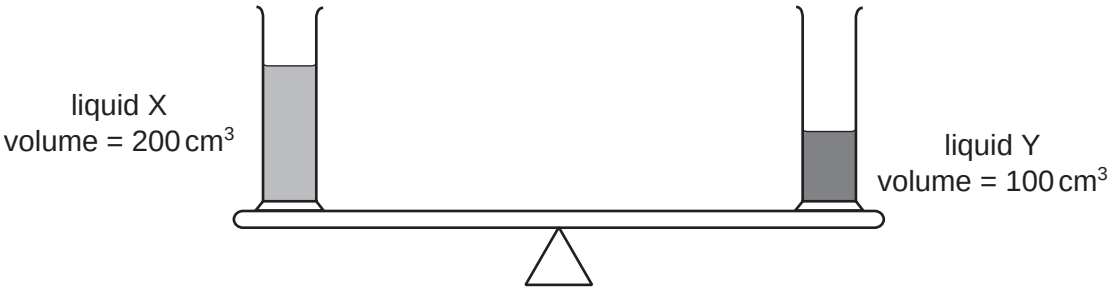
stage	P	Q	R	S
distance travelled / km	1.8	3.6	2.7	2.7
time taken / minutes	2	2	4	3

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

30 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?

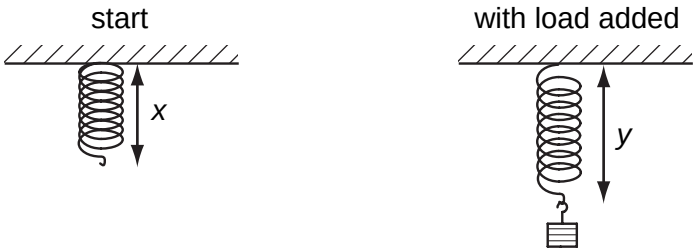
A density of X = $\frac{1}{2}$ × density of Y

B density of X = density of Y

C density of X = 2 × density of Y

D density of X = 4 × density of Y

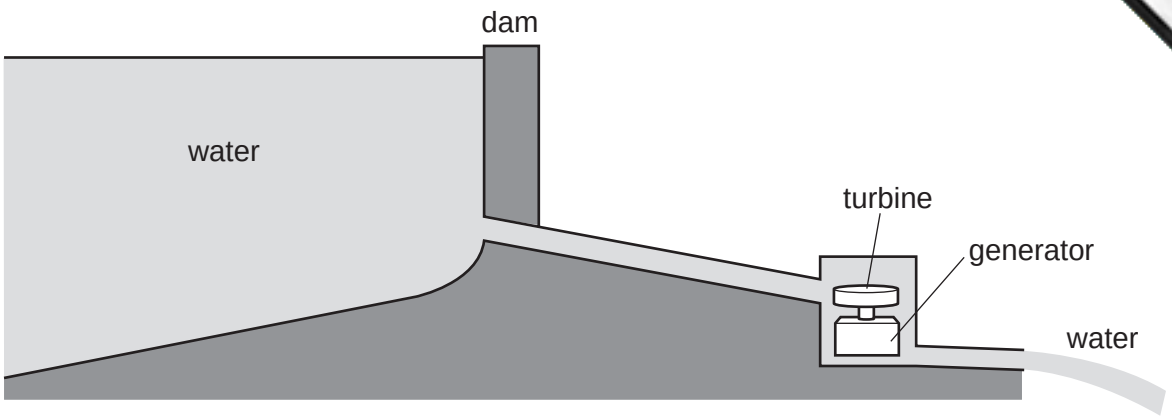
31 A student carries out an experiment to plot the extension-load graph for a spring. The diagrams show the apparatus at the start of the experiment and with a load added.



What is the extension caused by the load?

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

32 The diagram shows water stored behind a dam.



The water flows to a turbine and turns a generator.

Which sequence for the conversion of energy is correct?

A potential energy → kinetic energy → electrical energy

B kinetic energy → potential energy → electrical energy

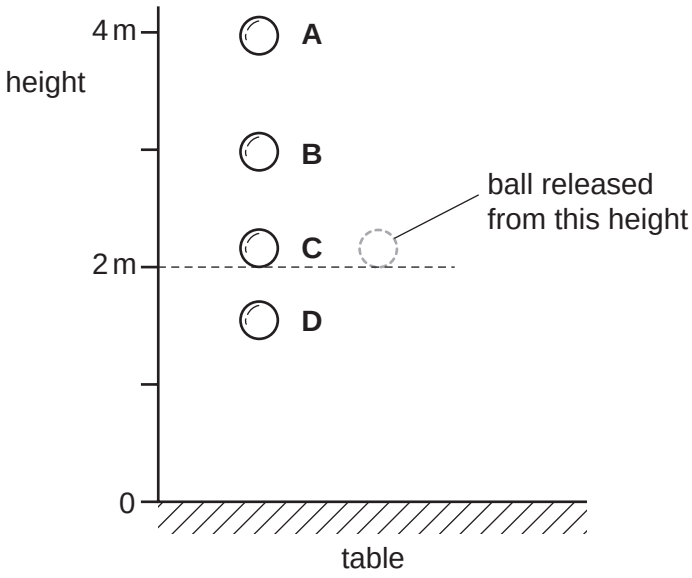
C potential energy → electrical energy → kinetic energy

D kinetic energy → electrical energy → potential energy

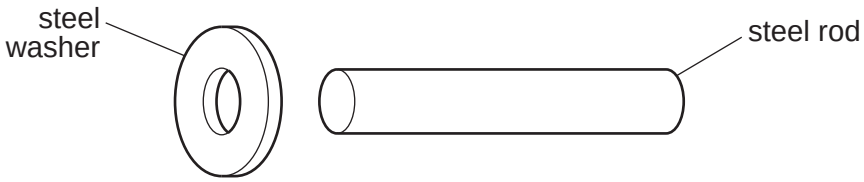
33 A rubber ball is dropped from a height of 2 metres onto a table.

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?



34 An engineer wants to fix a steel washer onto 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?

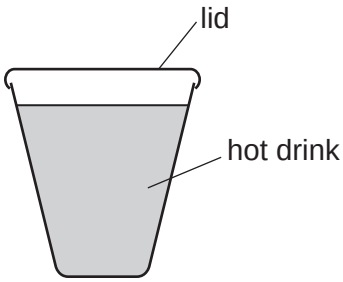
A Cool the washer and put it over the rod.

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.

35 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.

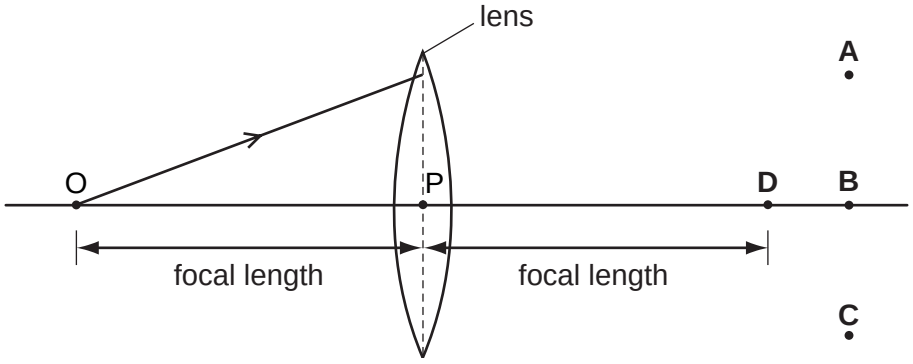
B convection.

C evaporation.

D radiation.

36 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?

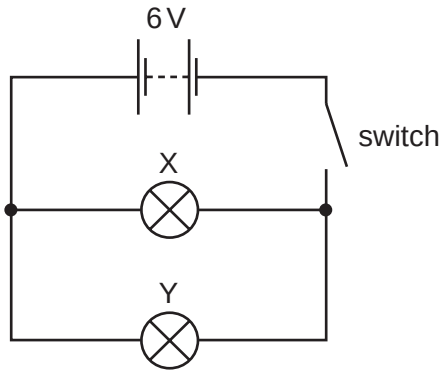


37 The table shows the voltage and current ratings for four electric heaters.

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

38 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.

39 Two different systems are used to transmit equal amounts of electrical power from one building to another.

One system uses low voltage and the other uses high voltage.

Which line in the table is correct about which system wastes least energy and why?

	least energy wasted	why
A	high voltage system	the current in the wires is bigger
B	high voltage system	the current in the wires is smaller
C	low voltage system	the current in the wires is bigger
D	low voltage system	the current in the wires is smaller

40 Which type of radiation can be stopped by a sheet of paper?

A alpha-particles

B beta-particles

C gamma-rays

D X-rays

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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 **X** b	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.).