



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

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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)

* 0 9 9 3 0 5 2 0 9 9 *

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.

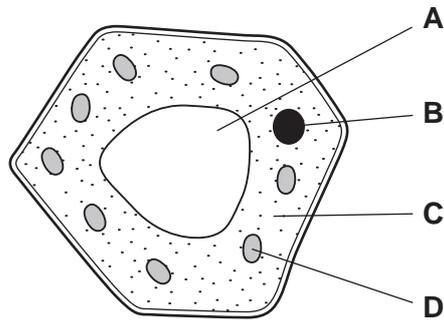
A copy of the Periodic Table is printed on page 20.

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

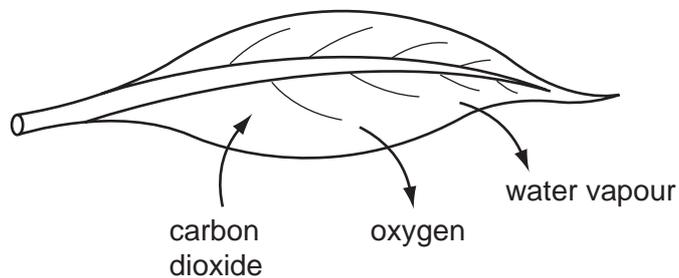


- 1 The diagram shows a mesophyll cell from a green plant.

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.

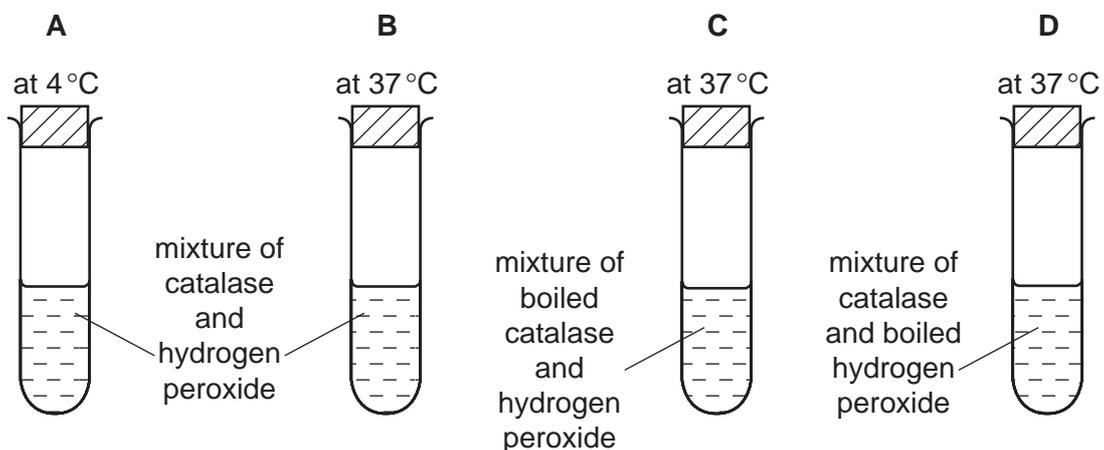


Which of the following has a higher concentration outside the leaf than inside the leaf?

- 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?



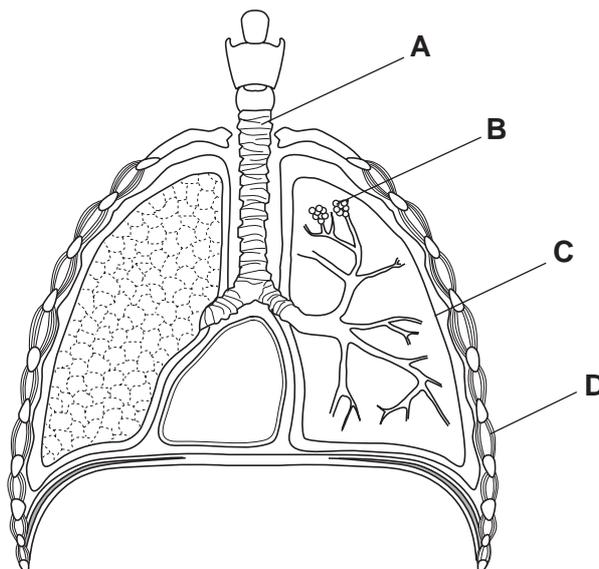
- 4 In which way do plants usually take in water from their surroundings?
- A as liquid through stomata
 B as liquid through root hairs
 C as vapour through stomata
 D as vapour through root hairs
- 5 A series of tests on a white liquid gave the following results.

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

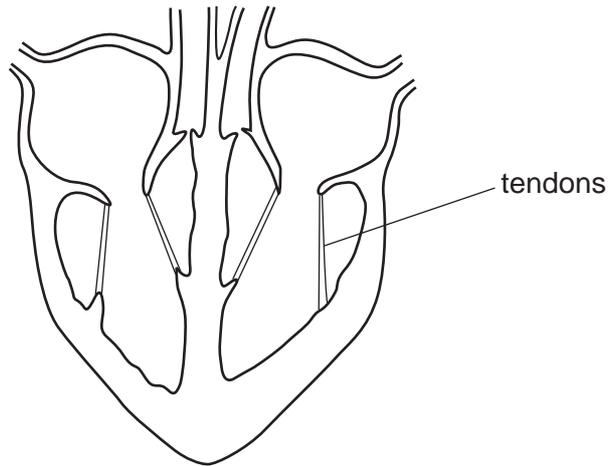
What did the white liquid contain?

- 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?



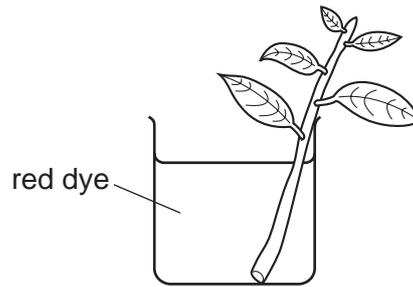
7 The diagram shows a section through the human heart.



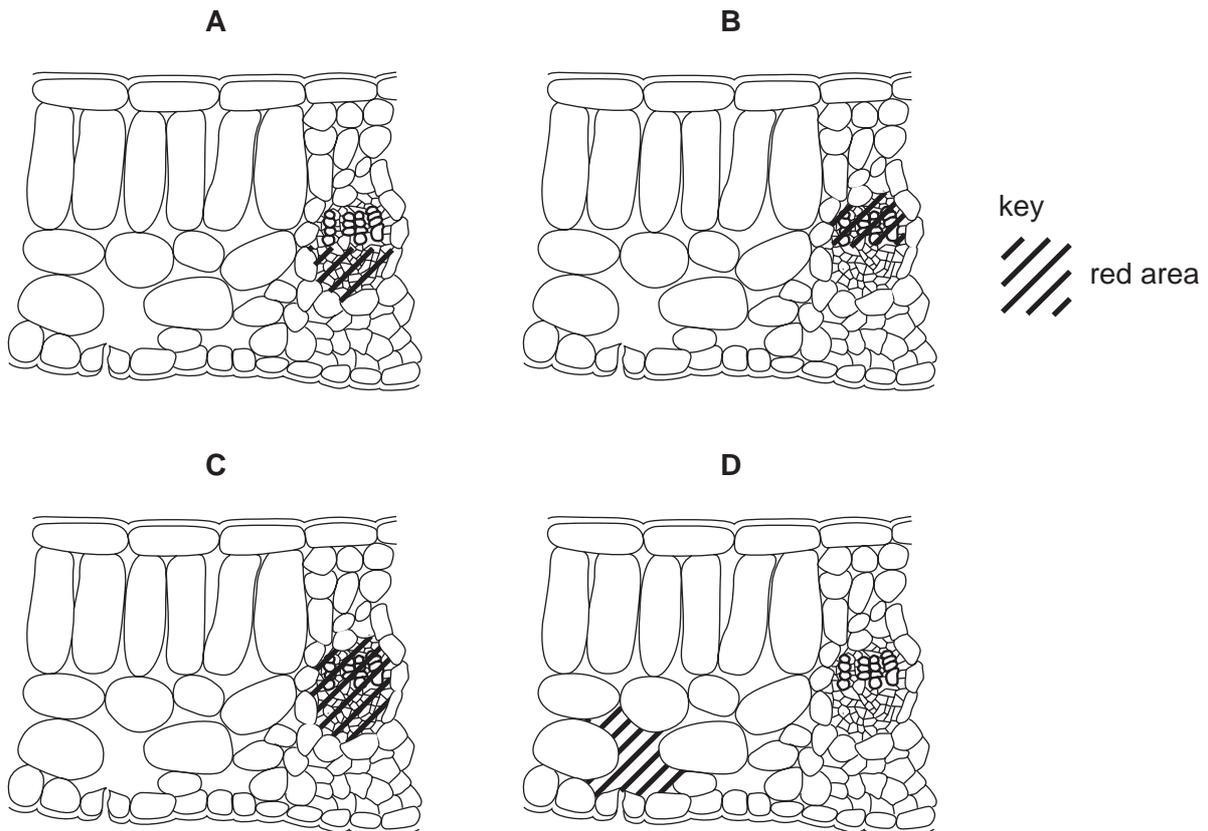
Which structures are joined by the tendons?

- 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?



- 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

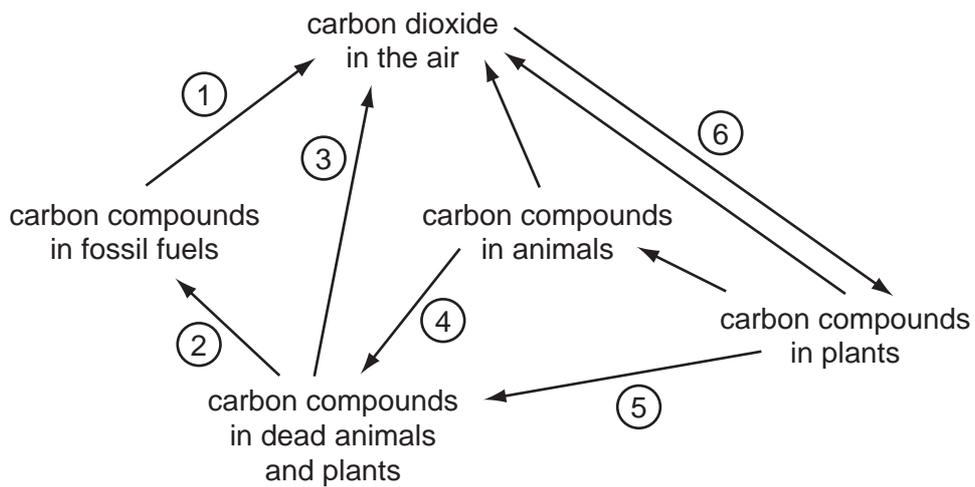
10 Which event that happens in the ovary of a flower starts seed formation?

- 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 ${}_{10}^{20}\text{Ne}$.

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 new2..... 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	✓	✓	x
C	x	✓	✓
D	x	x	✓

17 What does a word equation show?

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

18 Which formula contains the most elements?

- A NaOH B Rb₂S C SiCl₄ D SnO₂

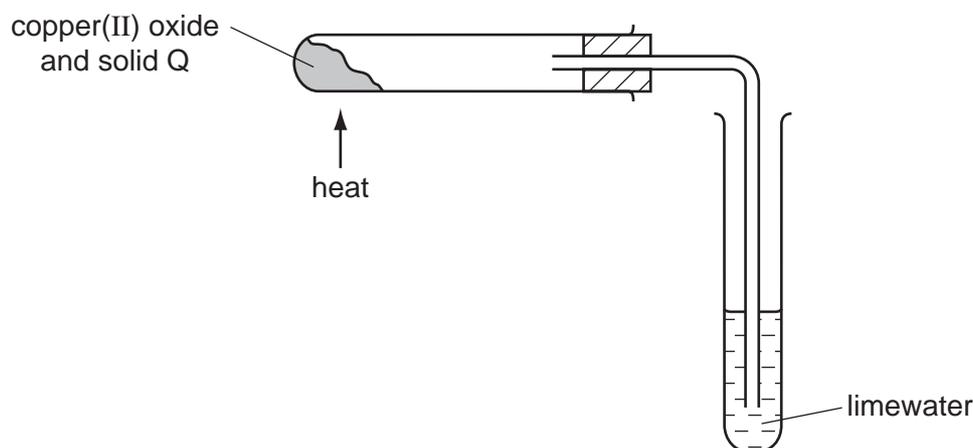
19 Urea, (NH₂)₂CO, is used as a fertiliser.

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.



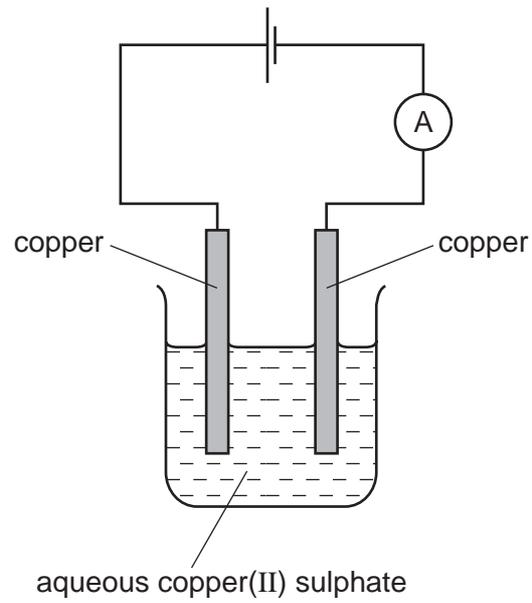
What is solid Q?

- 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

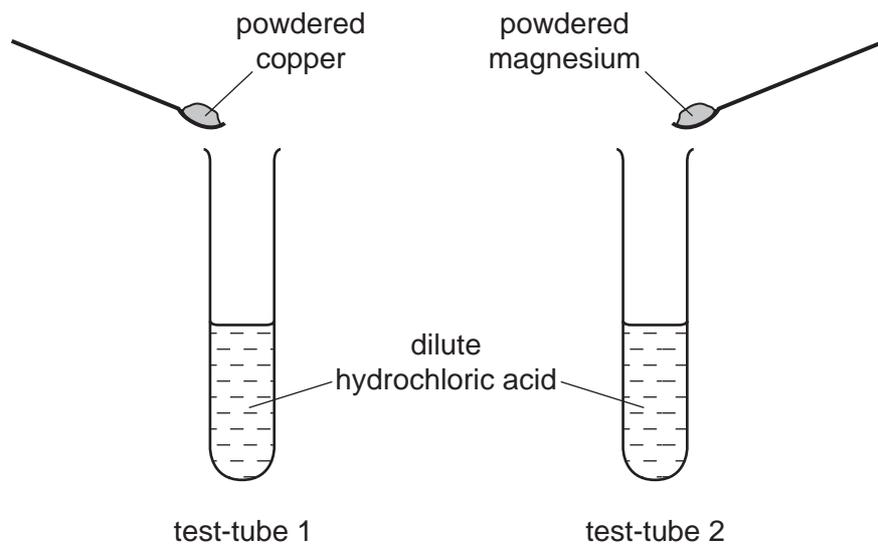
22 Impure copper is purified by electrolysis, as shown.



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?

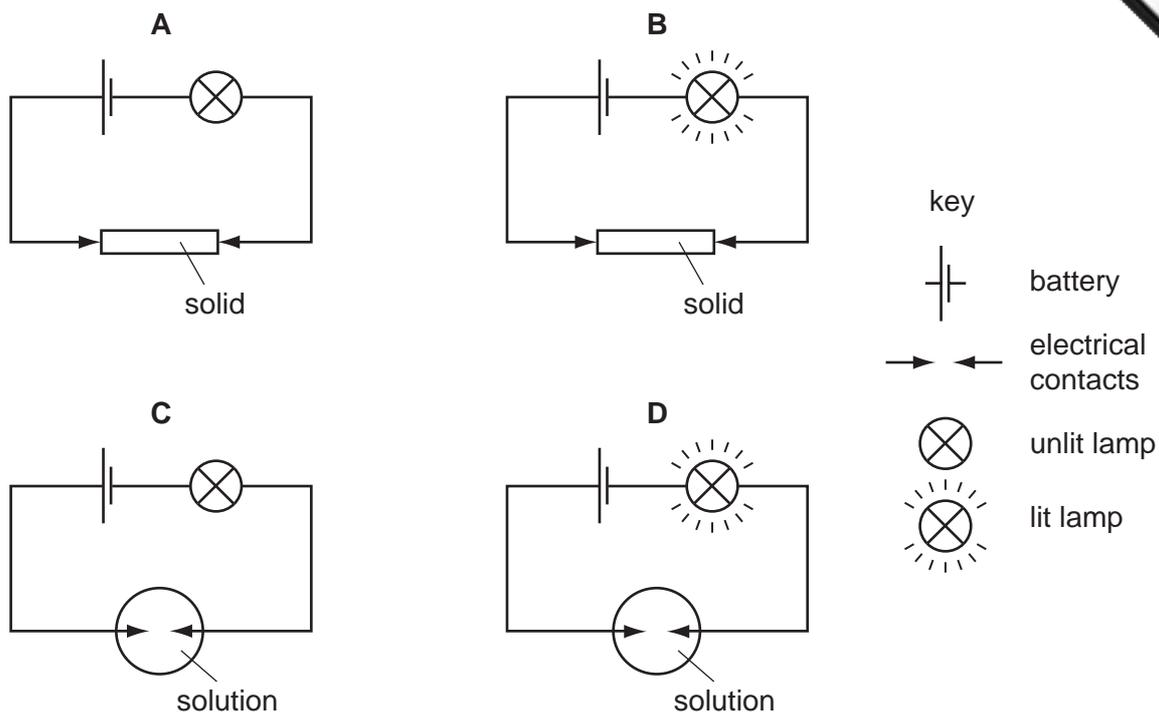
	test-tube 1	test-tube 2
A	blue	green
B	blue	red
C	red	green
D	red	red

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	✓	x
C	x	✓
D	x	x

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 time a race. 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?

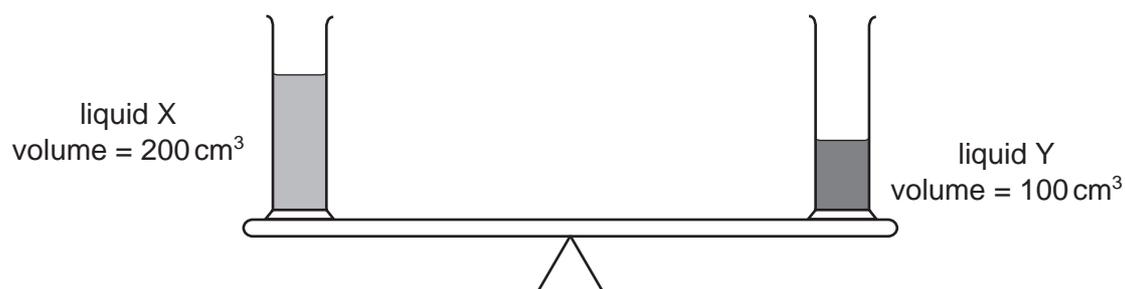
- A** Both stopwatches recorded the same time interval.
B Stopwatch X recorded 10 s longer than stopwatch Y.
C Stopwatch Y recorded 10 s longer than stopwatch X.
D Stopwatch Y recorded 50 s longer than stopwatch X.
- 29 A car travels at various speeds during a short journey.
- The table shows the distances 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?

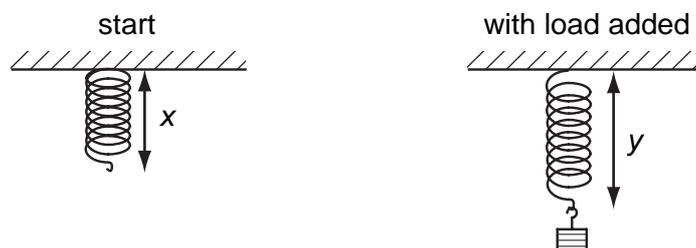
- A** P and Q **B** P and S **C** Q and R **D** R and S

- 30 Two identical measuring cylinders containing different liquids are placed on a simple beam balance. They balance as shown.



How does the density of X compare with the density of Y?

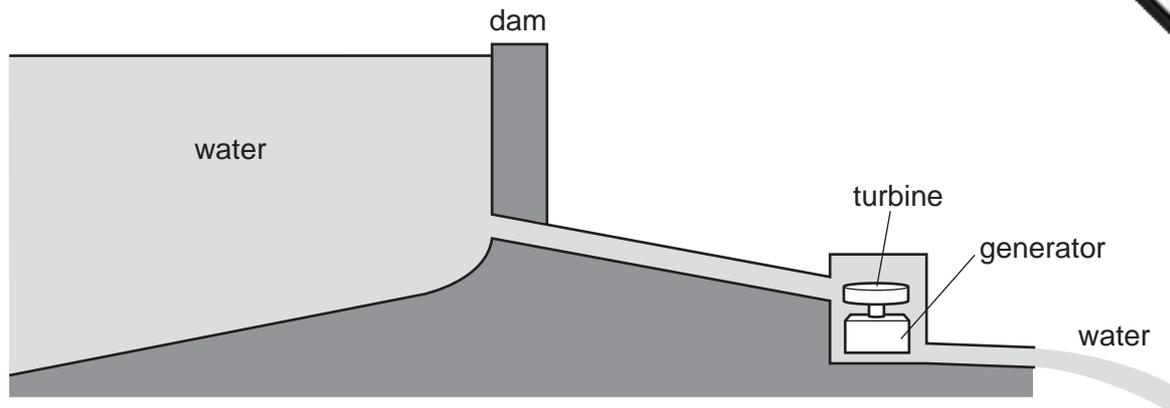
- A density of X = $\frac{1}{2} \times$ density of Y
- B density of X = density of Y
- C density of X = $2 \times$ density of Y
- D density of X = $4 \times$ density of Y
- 31 A student carries out an experiment to plot the extension-load graph for a spring. The diagrams show the apparatus at the start 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.

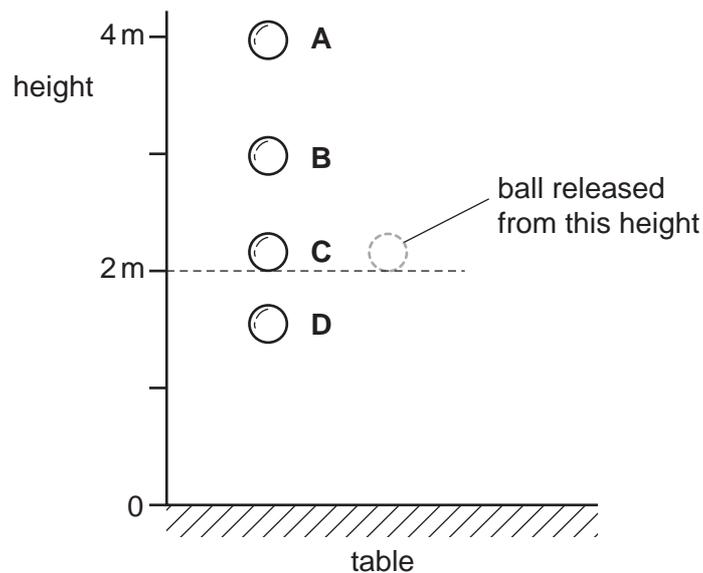
Which sequence for the conversion of energy is correct?

- A potential energy \rightarrow kinetic energy \rightarrow electrical energy
- B kinetic energy \rightarrow potential energy \rightarrow electrical energy
- C potential energy \rightarrow electrical energy \rightarrow kinetic energy
- D kinetic energy \rightarrow electrical energy \rightarrow potential energy

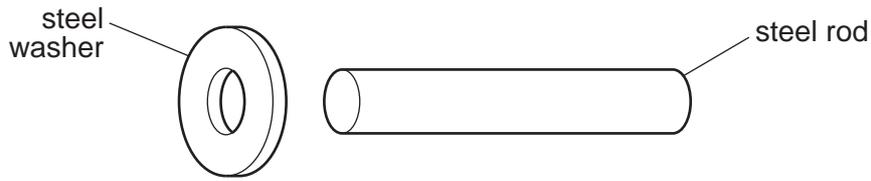
33 A rubber ball is dropped from a height of 2 metres onto a table.

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?

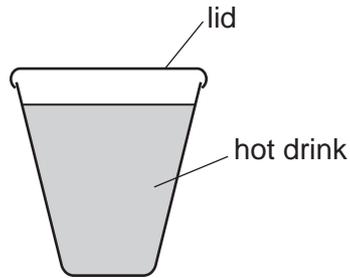


- 34 An engineer wants to fix a steel washer onto a steel rod. The rod is just too big to fit into the hole of the washer.



How can the engineer fit the washer onto the rod?

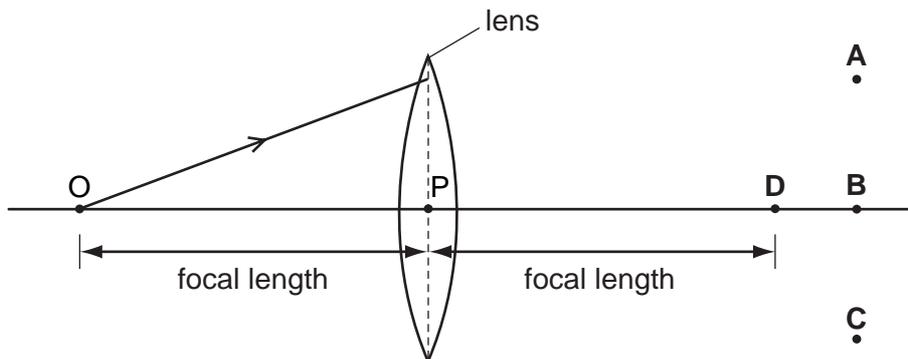
- A Cool the washer and put it over the rod.
 - B Cool the washer and rod to the same temperature and push them together.
 - C Heat the rod and then place it in the hole.
 - D Heat the washer and then place it over the rod.
- 35 A white plastic lid is placed on a plastic cup used for a hot drink.



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?

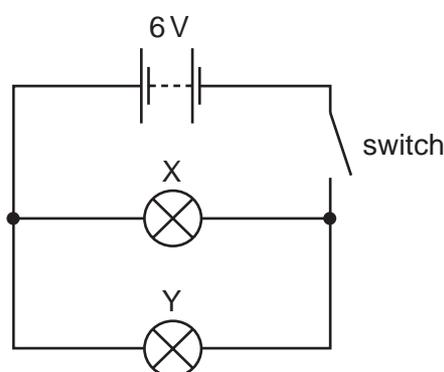


37 The table shows the voltage and current ratings for four electric heaters.

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

DATA SHEET
The Periodic Table of the Elements

		Group																							
		I	II	III	IV	V	VI	VII	VIII	IX	X														
		1 H Hydrogen 1																							
7	9	Li Lithium 3	Be Beryllium 4																						
23	24	Na Sodium 11	Mg Magnesium 12																						
39	40	K Potassium 19	Ca Calcium 20	45	48	51	52	55	56	59	59	64	65	70	73	75	79	80	84						
85	88	Rb Rubidium 37	Sr Strontium 38	Y Yttrium 39	Zr Zirconium 40	Nb Niobium 41	Mo Molybdenum 42	Tc Technetium 43	Ru Ruthenium 44	Rh Rhodium 45	Pd Palladium 46	Ag Silver 47	Cd Cadmium 48	In Indium 49	Sn Tin 50	Sb Antimony 51	Te Tellurium 52	I Iodine 53	Xe Xenon 54						
133	137	Cs Caesium 55	Ba Barium 56	La Lanthanum 57	Hf Hafnium 72	Ta Tantalum 73	W Tungsten 74	Re Rhenium 75	Os Osmium 76	Ir Iridium 77	Pt Platinum 78	Au Gold 79	Hg Mercury 80	Tl Thallium 81	Pb Lead 82	Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86						
	226	Fr Francium 87	Ra Radium 88	Ac Actinium 89																					
		*58-71 Lanthanoid series †90-103 Actinoid series																							
		a		X		b																			
		Key		X																					
		a = relative atomic mass		X = atomic symbol																					
		b = proton (atomic) number																							
												140	141	144	150	152	157	159	162	165	167	169	173	175	
		Ce Cerium 58	Pr Praseodymium 59	Nd Neodymium 60	Pm Promethium 61	Sm Samarium 62	Eu Europium 63	Gd Gadolinium 64	Tb Terbium 65	Dy Dysprosium 66	Ho Holmium 67	Er Erbium 68	Tm Thulium 69	Yb Ytterbium 70	Lu Lutetium 71										
		Th Thorium 90	Pa Protactinium 91	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										

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