



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.

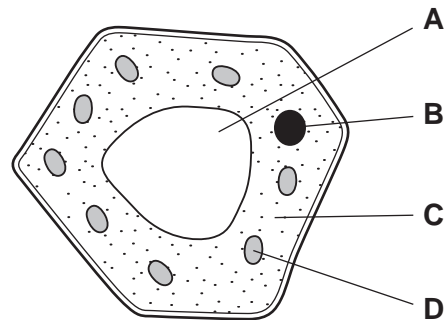
A copy of the Periodic Table is printed on page 20.

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

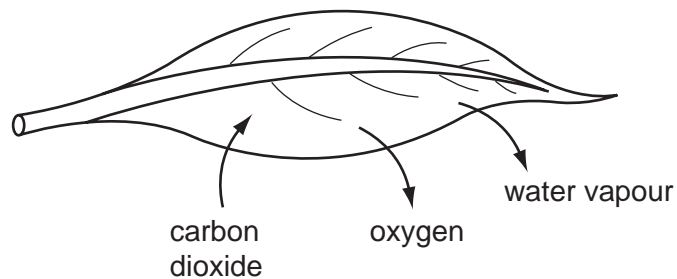


- 1 The diagram shows a mesophyll cell from a green plant.

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.

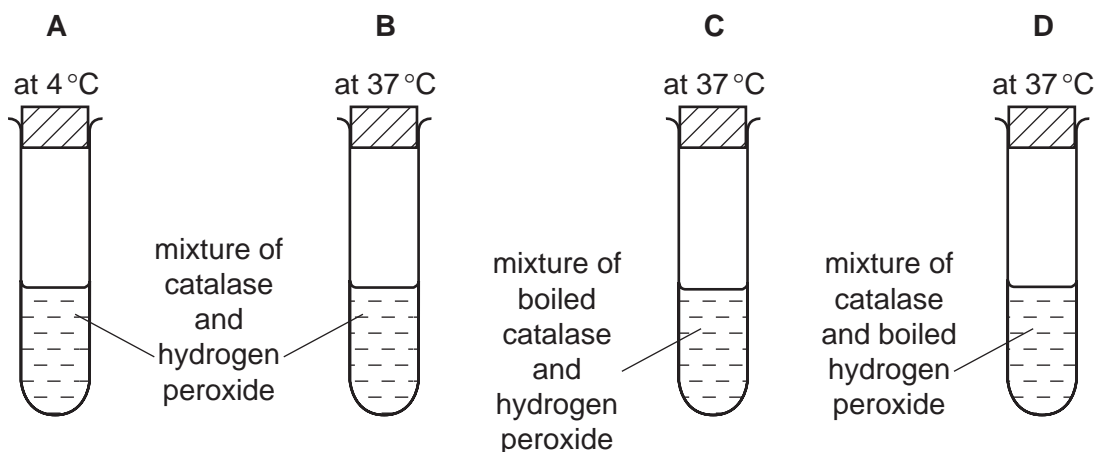


Which of the following has a higher concentration outside the leaf than inside the leaf?

- 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.

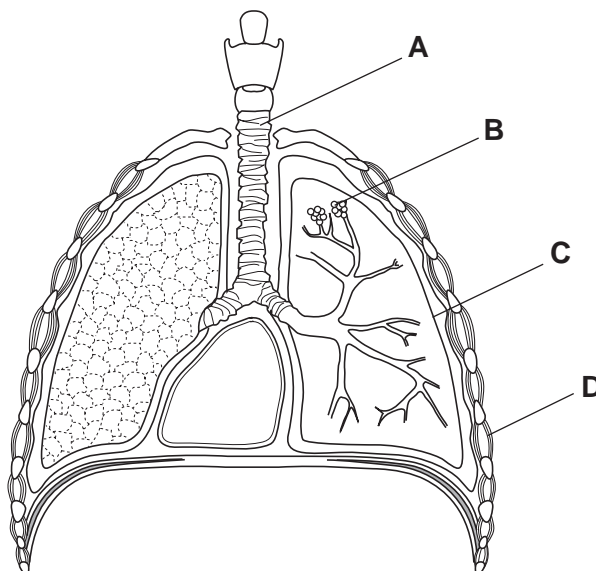
test	result of test
Benedict's	an orange-red colour
biuret	a pale blue colour
iodine	a blue-black colour

What did the white liquid contain?

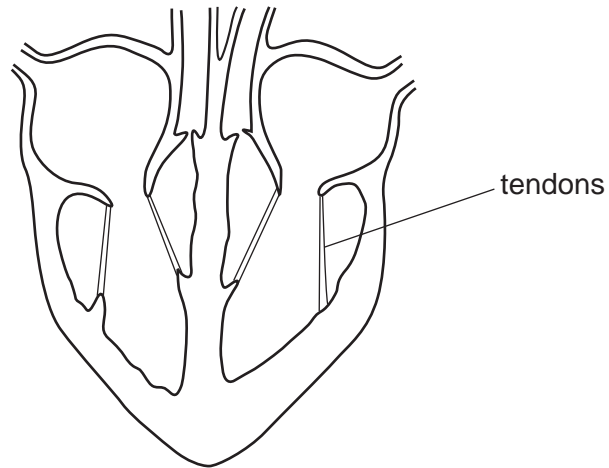
- A protein and starch only
- B protein and reducing sugar only
- C protein, reducing sugar and starch
- D reducing sugar and starch only

6 The diagram shows the thorax.

Which part has a lining containing goblet cells?



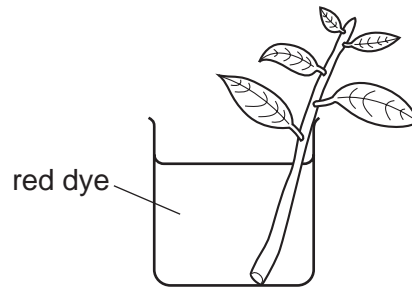
7 The diagram shows a section through the human heart.



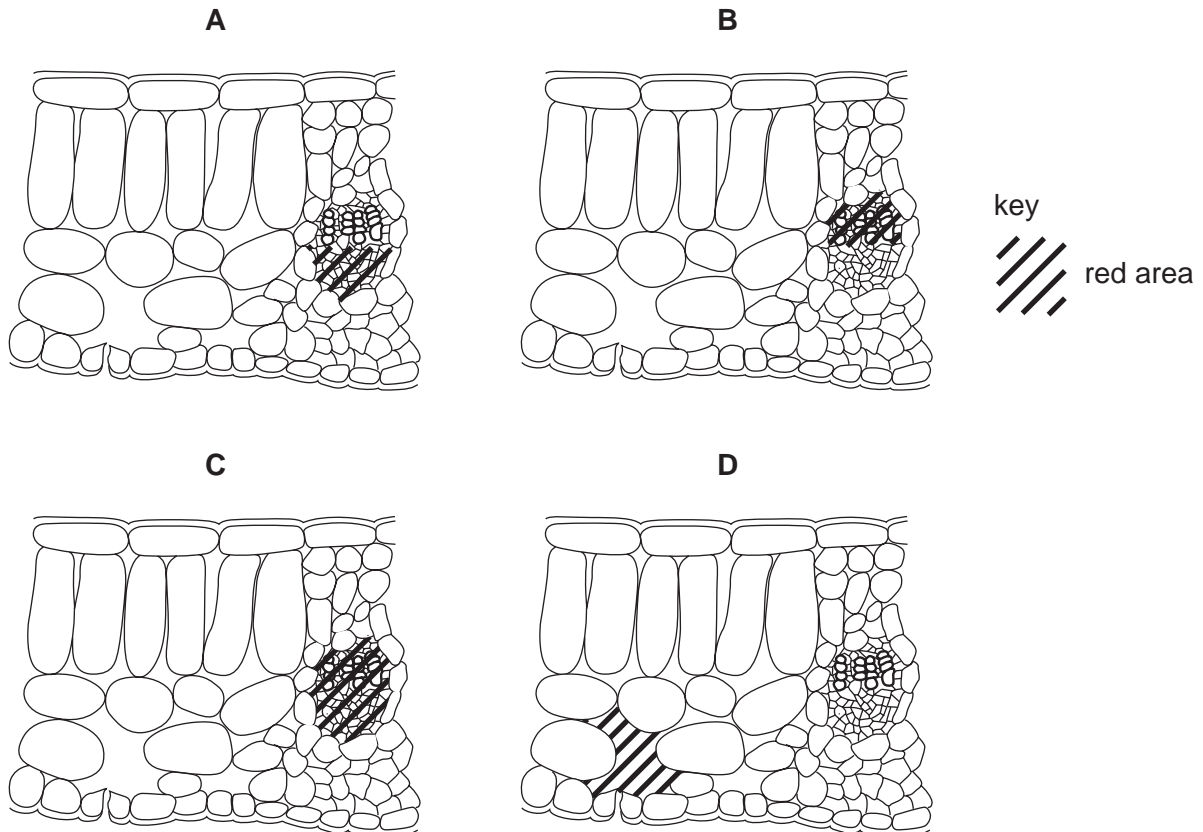
Which structures are joined by the tendons?

- 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

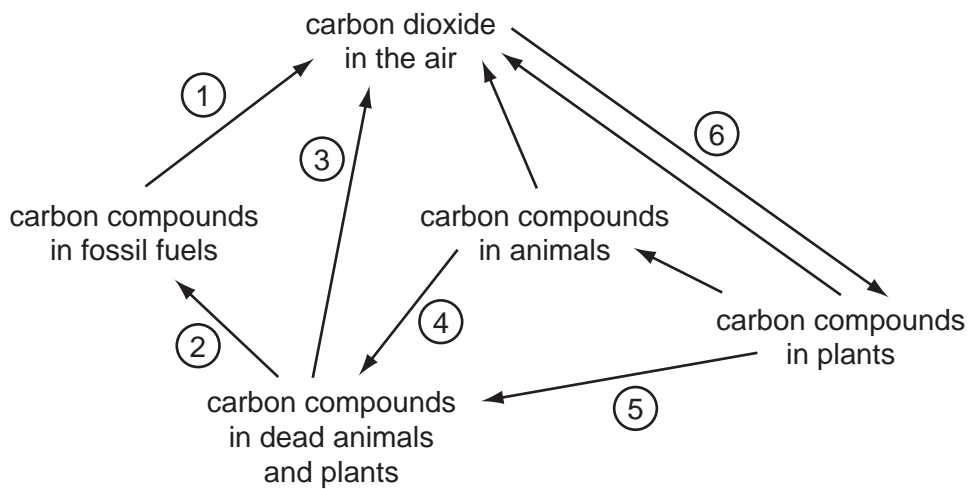
10 Which event that happens in the ovary of a flower starts seed formation?

- 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

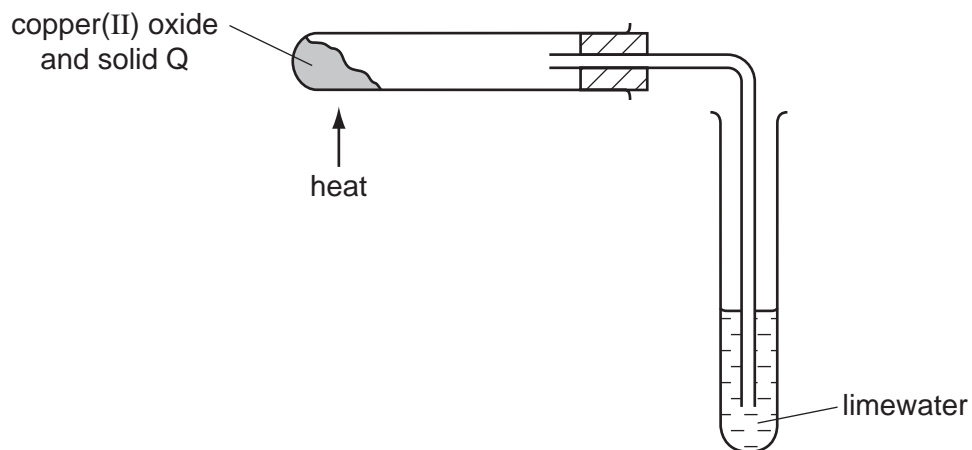
19 Urea, (NH₂)₂CO, is used as a fertiliser.

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.



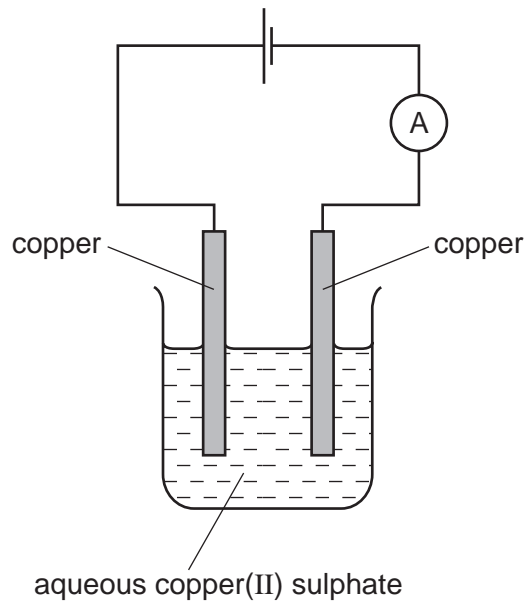
What is solid Q?

- 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

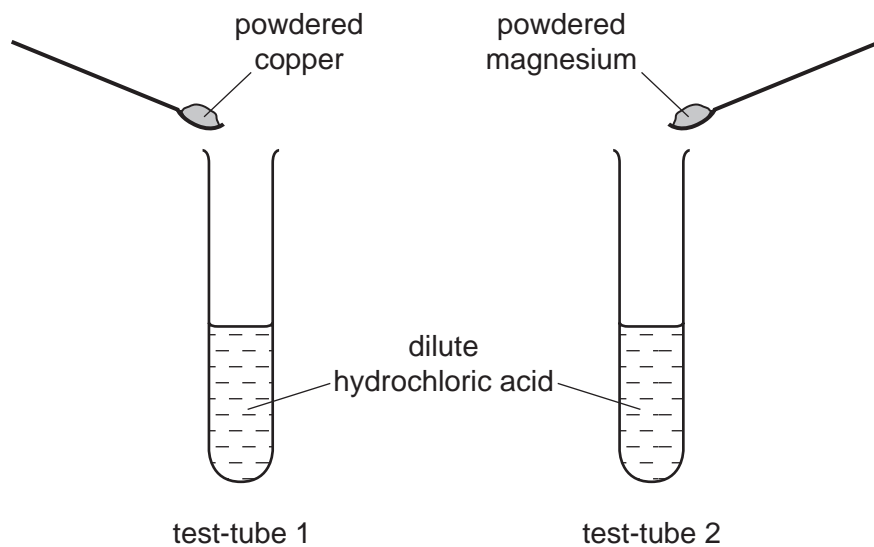
22 Impure copper is purified by electrolysis, as shown.



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?

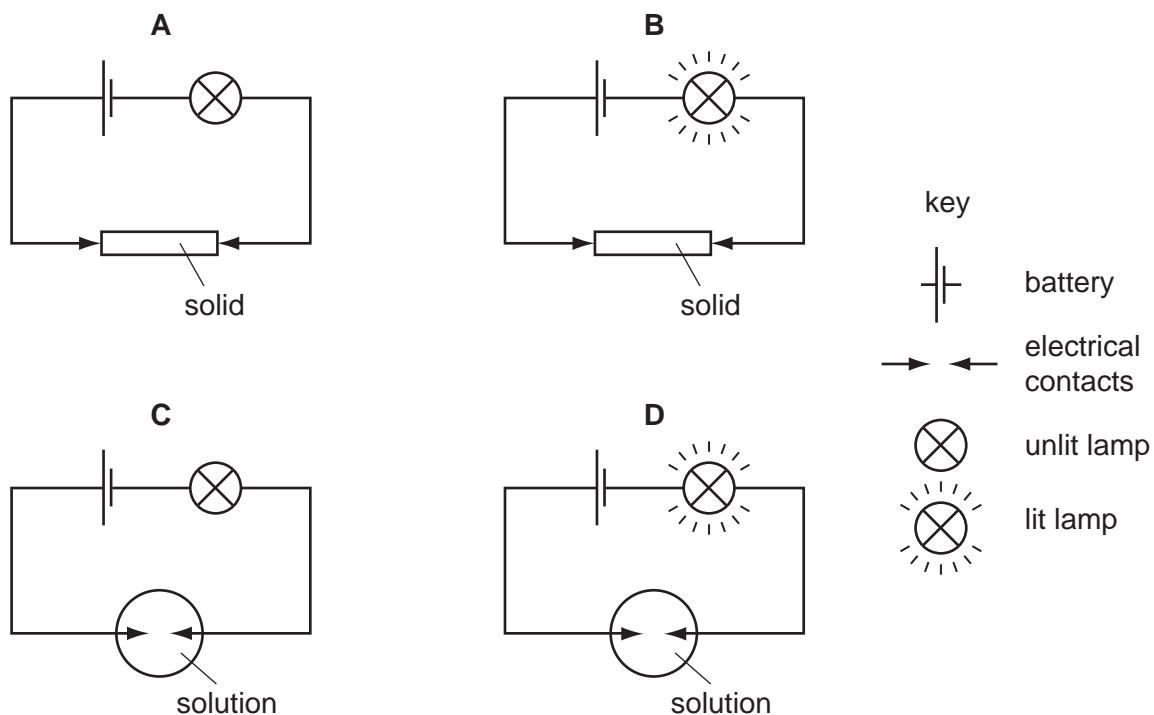
	test-tube 1	test-tube 2
A	blue	green
B	blue	red
C	red	green
D	red	red

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.

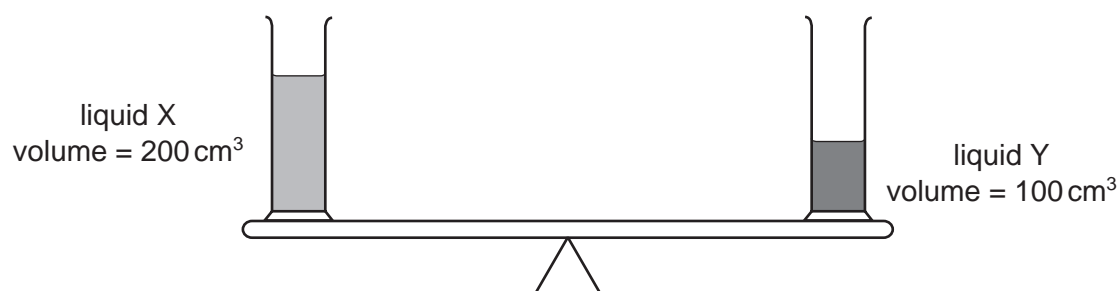
The table shows the distances travelled and the time taken during each of four stages P, Q, R and S.

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?

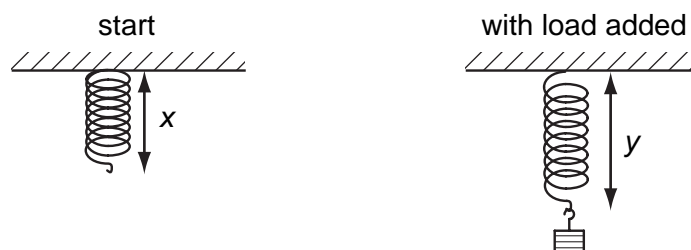
- A** P and Q
- B** P and S
- C** Q and R
- D** R and S

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



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

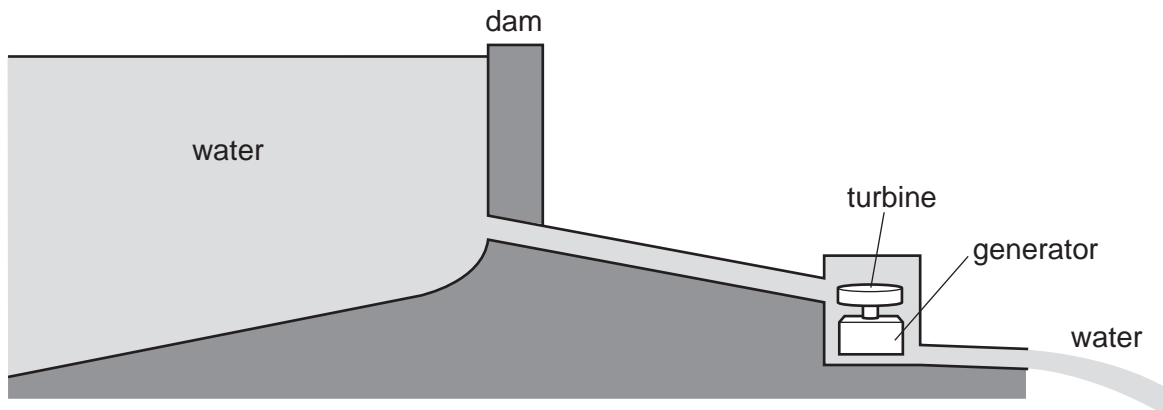
- A density of X = $\frac{1}{2}$ × density of Y
- B density of X = density of Y
- C density of X = 2 × density of Y
- D density of X = 4 × density of Y
- 31 A student carries out an experiment to plot the extension-load graph for a spring. The diagrams show the apparatus at the start of the experiment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

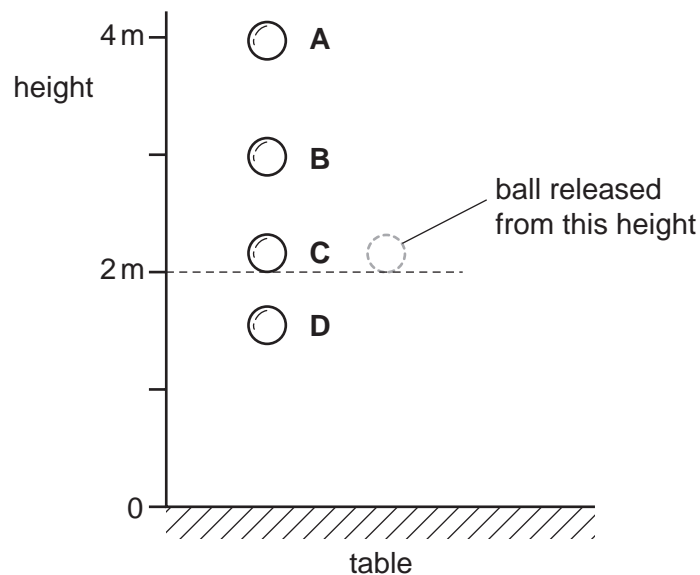
Which sequence for the conversion of energy is correct?

- A potential energy \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

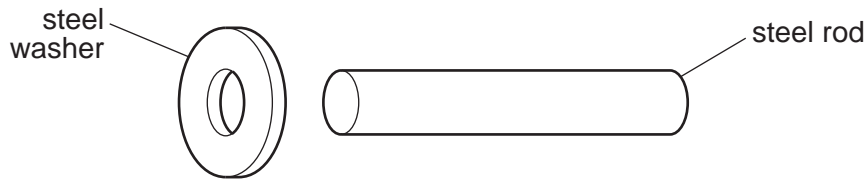
33 A rubber ball is dropped from a height of 2 metres onto a table.

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?

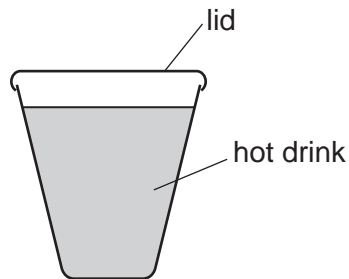


- 34 An engineer wants to fix a steel washer onto a steel rod. The rod is just too big to fit into the hole of the washer.



How can the engineer fit the washer onto the rod?

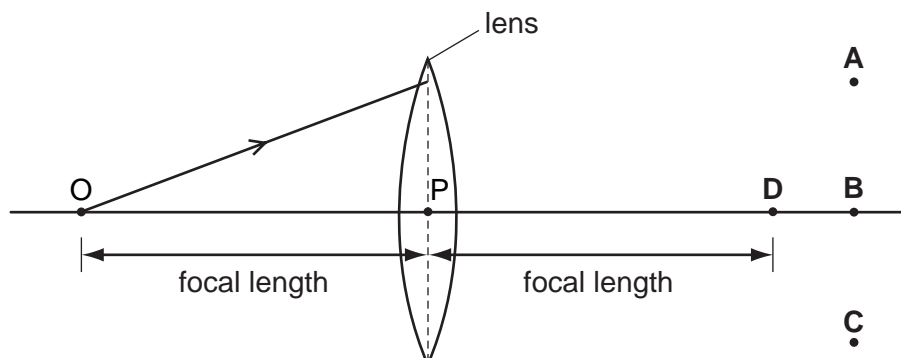
- A Cool the washer and put it over the rod.
 - B Cool the washer and rod to the same temperature and push them together.
 - C Heat the rod and then place it in the hole.
 - D Heat the washer and then place it over the rod.
- 35 A white plastic lid is placed on a plastic cup used for a hot drink.



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?

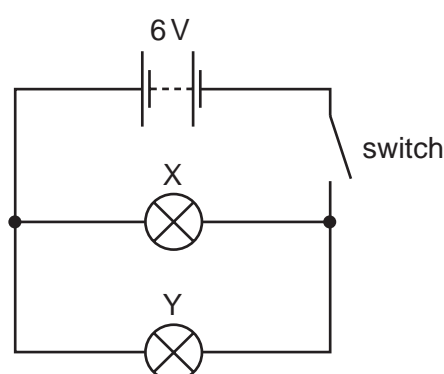


37 The table shows the voltage and current ratings for four electric heaters.

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

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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	9 Li Lithium 3	4 Be Beryllium											20 Ne Neon 10																																
23	12 Na Sodium 11	24 Mg Magnesium											35.5 Cl Chlorine 17																																
39	19 K Potassium	40 Ca Calcium 20	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	37 Rb Rubidium	38 Sr Strontium	48 Ti Titanium 22	91 Zr Zirconium 40	89 Y Yttrium 39	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	55 Cs Caesium	56 Ba Barium	73 Ta Tantalum 73	74 W Tungsten 74	75 Re Rhenium 75	93 Nb Niobium 41	96 Mo Molybdenum 42	98 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54																													
87	87 Fr Francium	88 Ra Radium	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	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 At Astatine 85	210 Rn Radon 86																													
												226 Ra Radium 88	227 Ac Actinium 89	†																															
												*58-71 Lanthanoid series		†90-103 Actinoid series																															
140	58 Ce Cerium	59 Pr Praseodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium	72 Hf Hafnium 72	73 Yb Ytterbium 70	74 Lu Lutetium 71	75 La Lanthanum 58	76 Ce Cerium 59	77 Pr Praseodymium 59	78 Nd Neodymium 60	79 Pm Promethium 61	80 Sm Samarium 62	81 Eu Europium 63	82 Gd Gadolinium 64	83 Tb Terbium 65	84 Dy Dysprosium 66	85 Ho Holmium 67	86 Er Erbium 68	87 Tm Thulium 69	88 Yb Ytterbium 70	89 Lu Lutetium 71	90 Th Thorium 90	91 Pa Protactinium 91	92 U Uranium 92	93 Np Neptunium 93	94 Pu Plutonium 94	95 Am Americium 95	96 Cm Curium 96	97 Bk Berkelium 97	98 Cf Californium 98	99 Es Einsteinium 99	100 Fm Fermium 100	101 Md Mendelevium 101	102 No Nobelium 102	103 Lr Lawrencium 103

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

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

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