

Centre Number	Candidate Number	Name
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CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/01

Paper 1 Multiple Choice

May/June 2003

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.

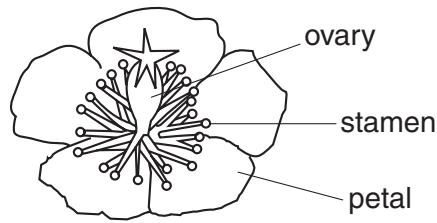
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

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 The diagram shows a flower.



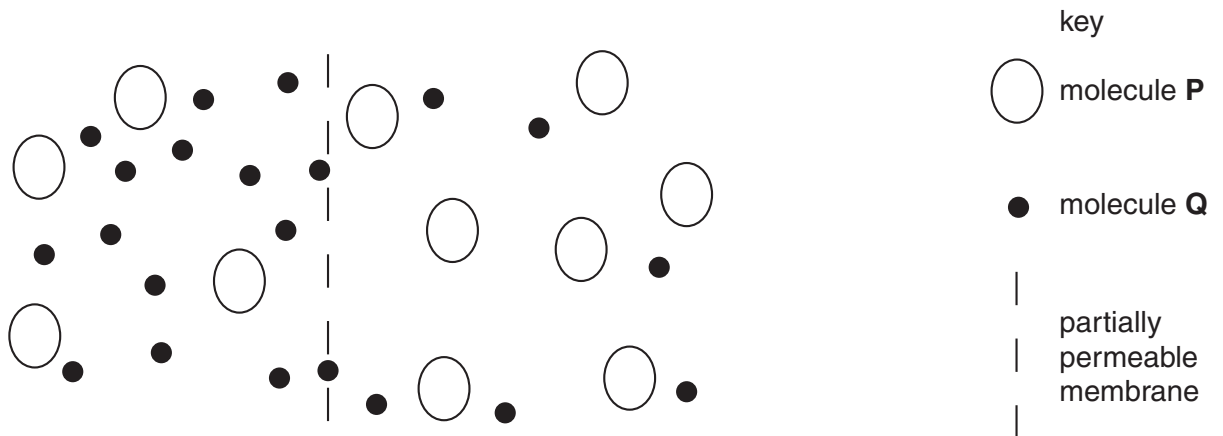
Use the key to identify the flower.

- 1 Petals four go to 2
- Petals five go to 3

- 2 Ovary above the petals flower **A**
- Ovary below the petals flower **B**

- 3 Stamens less than five flower **C**
- Stamens more than five flower **D**

2 The diagram shows a partially permeable membrane through which molecules pass only by osmosis.



What is molecule **Q**?

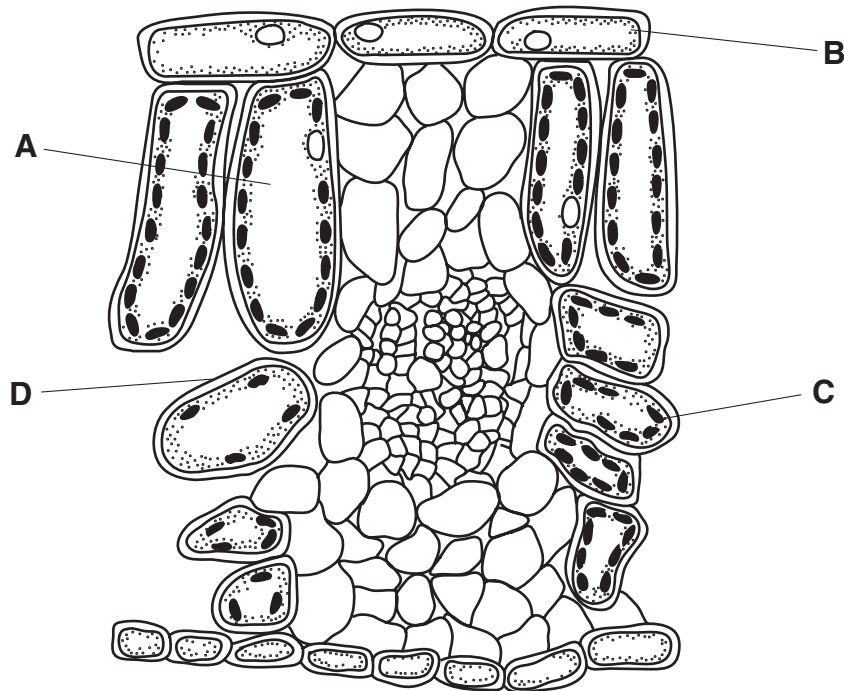
- A** amino acid
- B** starch
- C** sugar
- D** water

3 What is the main support for the stems of woody plants?

- A cartilage
- B lignin
- C phloem
- D turgidity

4 The diagram shows a section through a green leaf.

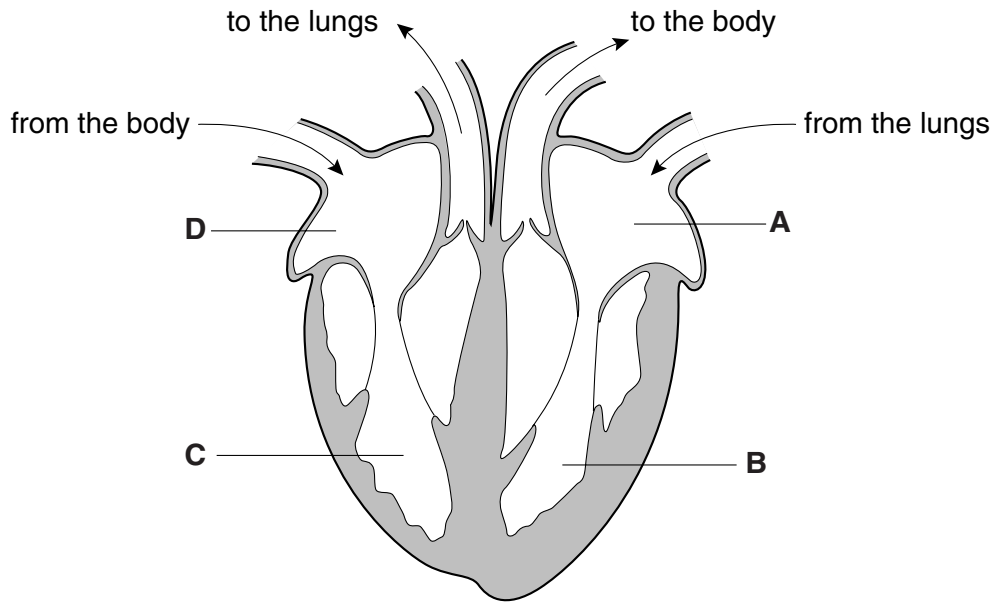
Where are carbohydrates made?



5 Which are products of respiration?

- A carbon dioxide and nitrogen
- B carbon dioxide and water
- C nitrogen and water
- D oxygen and carbon dioxide

6 From which chamber of the human heart is blood pumped most strongly?



Mackean (adapted)

7 Which of the following is part of a haemoglobin molecule?

- A calcium
- B iron
- C vitamin C
- D vitamin D

8 The table shows the amount of protein and fat in 100 g samples of some foods.

foods	protein /g	fat /g
meat	18.0	17.0
bread	9.0	1.5
fish	18.0	0.5
eggs	13.0	11.0
potato chips	4.0	9.0

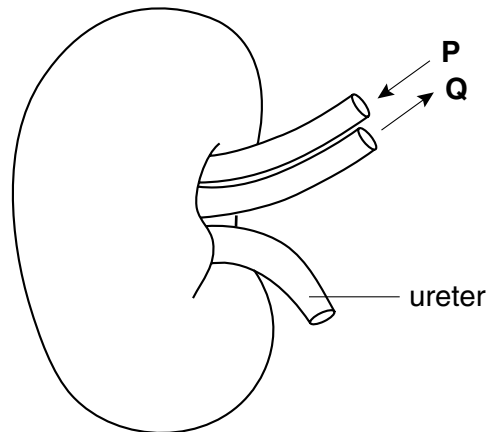
Which foods are the best value for body-building?

- A bread and meat
- B bread and potato chips
- C meat and eggs
- D meat and fish

9 What is **always** released when respiration takes place?

- A carbon dioxide
- B energy
- C lactic acid
- D water

10 The diagram shows a human kidney and its blood supply.



Compared with the blood in vessel **P**, the blood in **Q** has

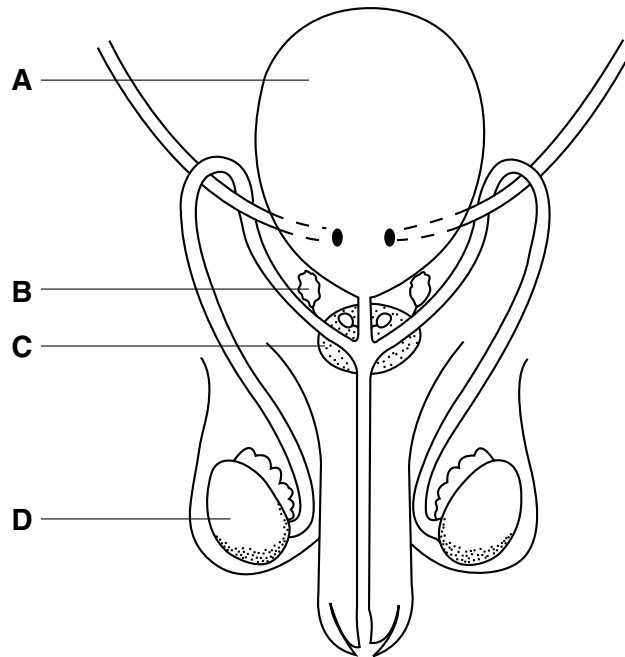
- A less urea and less oxygen.
 - B less urea and more oxygen.
 - C more urea and less oxygen.
 - D more urea and more oxygen.
- 11 A student placed four sets of seeds in different conditions.

Which set of conditions must be kept constant to show the effect of temperature on germination?

- A temperature and water only
- B temperature only
- C temperature, water and oxygen
- D water, oxygen and light intensity

12 The diagram shows the human male reproductive system.

In which region are sperms produced?



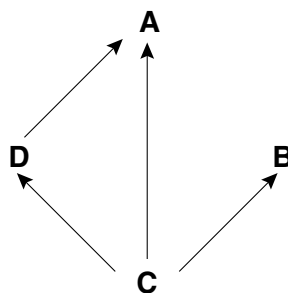
13 A heterozygous tall plant was crossed with a pure-breeding short plant of the same species. The resulting seeds were collected and grown to produce the next generation.

What were the approximate percentages of tall and short offspring?

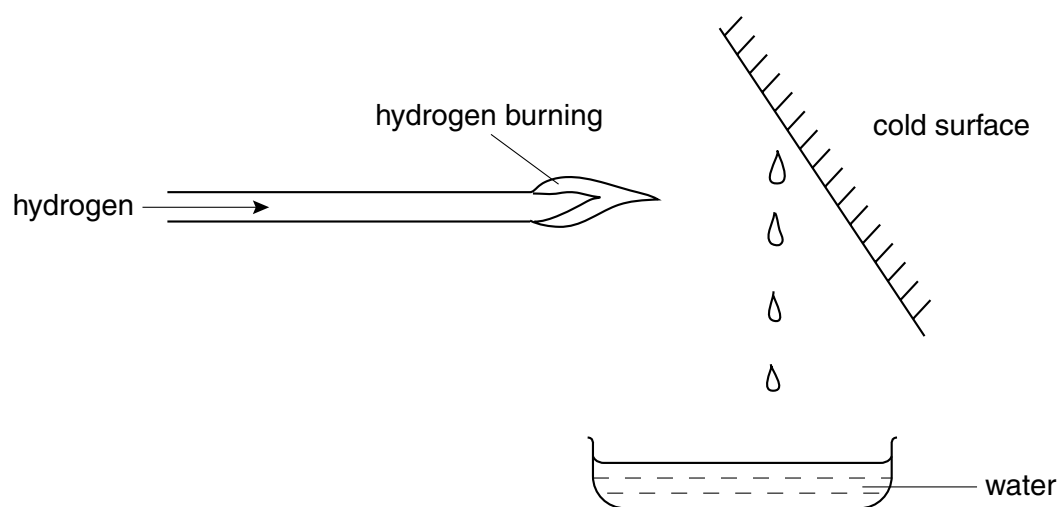
	percentage of tall offspring	percentage of short offspring
A	25	75
B	50	50
C	75	25
D	100	0

14 The diagram shows a food web of four organisms. The arrows in the diagram show the flow of energy in the food web.

Which organism is a producer?



15 Hydrogen is burnt in air, as shown.



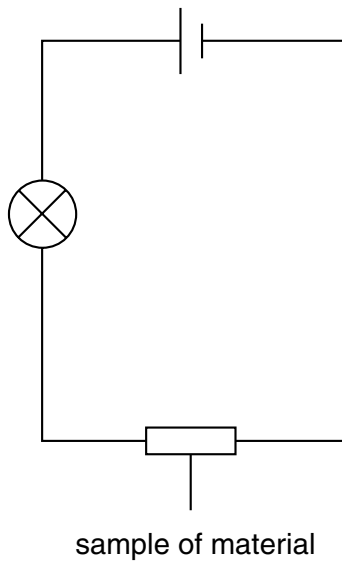
What happens?

- A Atoms of water are formed.
 - B The element water is formed.
 - C The compound water is formed.
 - D The mixture water is formed.
- 16 Element X can form 4 covalent bonds. Element Y can form 2 covalent bonds.

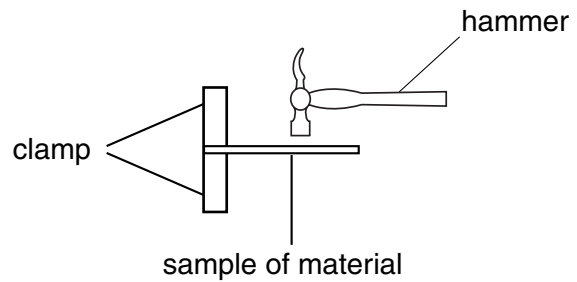
What is the simplest formula of the compound formed by X and Y?

- A XY_2
- B X_2Y
- C X_2Y_4
- D X_4Y_2

17 Samples of four different materials are tested in the experiments shown.



experiment 1



experiment 2

The results are given in the table.

Which material is a metal?

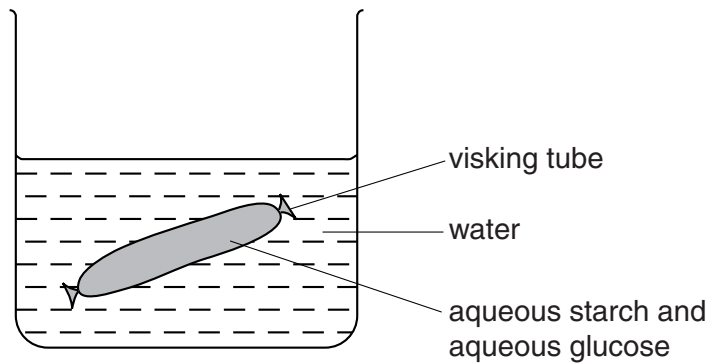
material	experiment 1	experiment 2
A	lamp does not light	bends
B	lamp does not light	breaks
C	lamp lights	bends
D	lamp lights	breaks

18 Which words correctly complete the gaps below?

Molecules of1..... join together to form2..... that is thermoplastic and3..... on heating.

	gap 1	gap 2	gap 3
A	a monomer	a polymer	hardens
B	a monomer	a polymer	softens
C	a polymer	a monomer	hardens
D	a polymer	a monomer	softens

- 19 Visking tubing is partially permeable. A length of this tubing is filled with aqueous starch and glucose, placed in pure water and left for an hour.

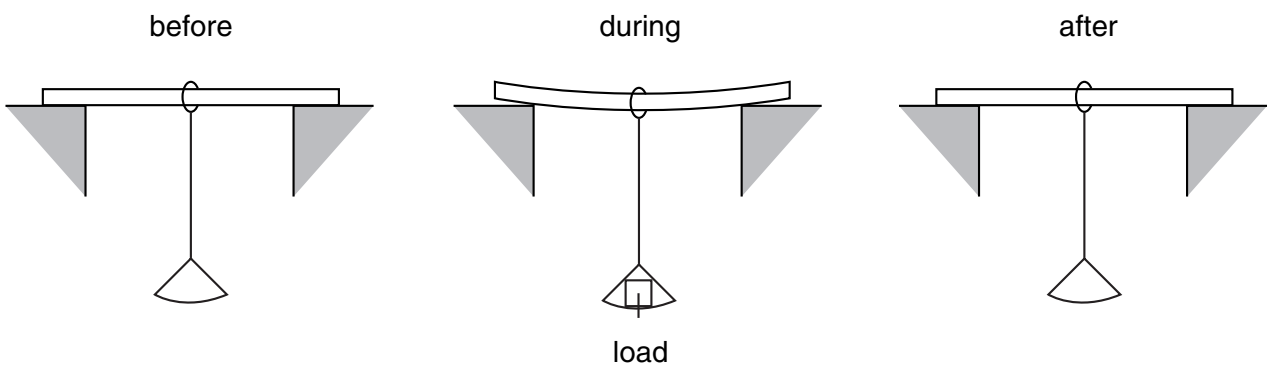


Iodine tests and Benedict's tests are then carried out. The results are shown below.

liquid tested	iodine test	Benedict's test
inside visking tubing	blue/black	orange/red suspension
outside visking tubing	no change	orange/red suspension

Which substances can pass through the tubing?

- A both glucose and starch
 - B only glucose
 - C only starch
 - D neither glucose nor starch
- 20 A material is tested as shown.



Which property of the material is being tested?

- A elasticity
- B electrical conductivity
- C hardness
- D porosity

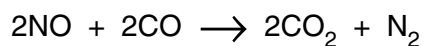
21 The names and formulae of four minerals are shown.

Which mineral does **not** contain a metallic element?

bauxite	Al_2O_3
galena	PbS
horn silver	AgCl
quartz	SiO_2

- A bauxite
- B galena
- C horn silver
- D quartz

22 The catalytic converter in the exhaust of a car brings about the following reaction.



Which changes take place?

	oxidation	reduction
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

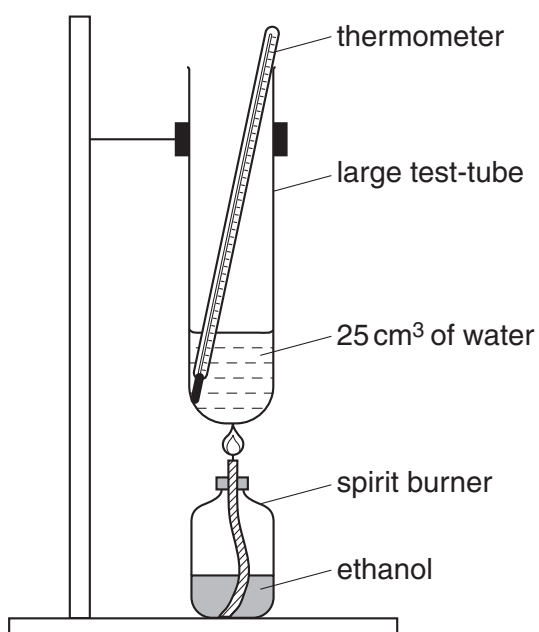
23 Tests on some 10 cm^3 samples of tap water give the following results.

test	result
add 2 cm^3 of soap solution and shake	no lather
boil the tap water, add 2 cm^3 of soap solution and shake	lather
add acidified aqueous barium nitrate	white precipitate

What do the results show about the tap water?

- A It is hard and contains chloride ions.
- B It is hard and contains sulphate ions.
- C It is soft and contains chloride ions.
- D It is soft and contains sulphate ions.

- 24 Which of the following is formed as a result of the weathering of rocks?
- A limestone
B methane
C soil
D water
- 25 Which metal is used with aqueous sodium hydroxide to test for nitrate ions in solution?
- A aluminium
B copper
C magnesium
D tin
- 26 Ethanol is burnt in a spirit burner as shown.

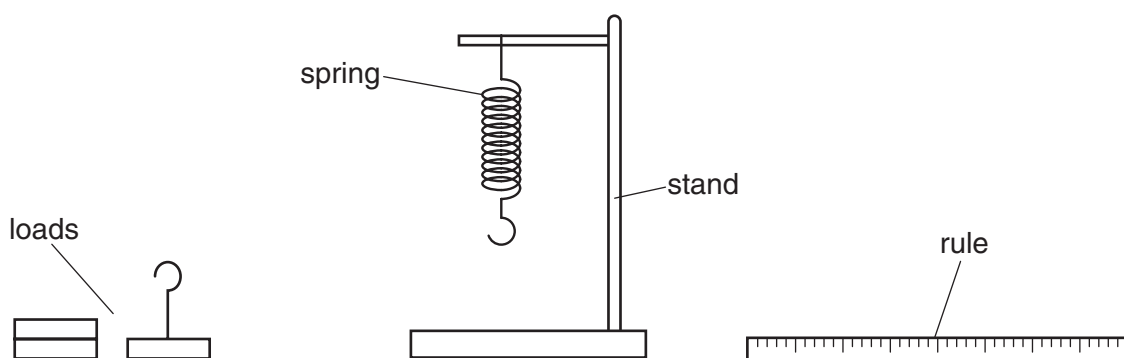


The mass of the burner and its contents is measured before and after the experiment. The thermometer is read before and after the experiment.

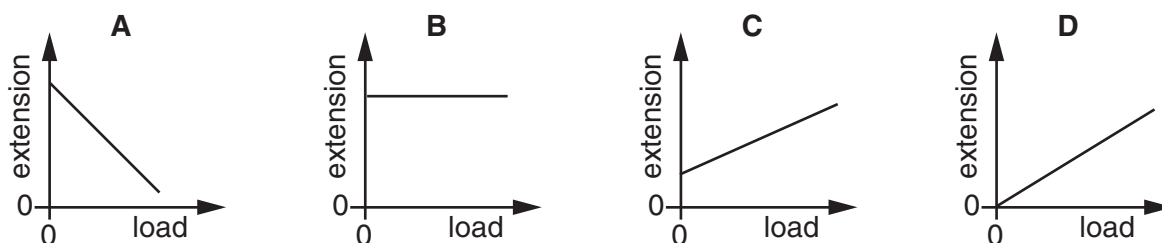
What are the expected results?

	mass of burner and contents	thermometer reading
A	decreases	increases
B	decreases	stays the same
C	increases	increases
D	increases	stays the same

- 30 A spring is suspended from a stand. Loads are added and the extensions are measured.



Which graph shows the result of plotting extension against load?



- 31 When water evaporates, some molecules escape.

Which molecules escape?

- A the molecules at the bottom of the liquid with less energy than others
 - B the molecules at the bottom of the liquid with more energy than others
 - C the molecules at the surface with less energy than others
 - D the molecules at the surface with more energy than others
- 32 A person holds a glass beaker in one hand and fills it quickly with hot water. It takes several seconds before his hand starts to feel the heat.

Why is there this delay?

- A Glass is a poor conductor of heat.
- B Glass is a good conductor of heat.
- C Water is a poor conductor of heat.
- D Water is a good conductor of heat.

33 What causes refraction when light travels from air into glass?

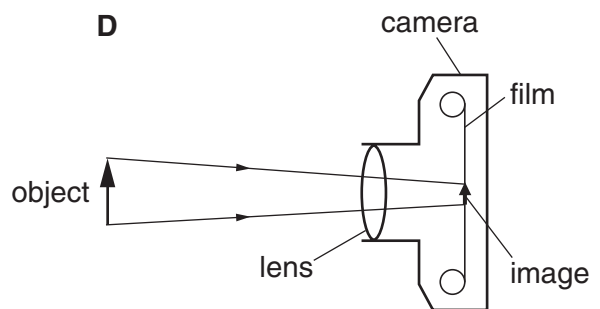
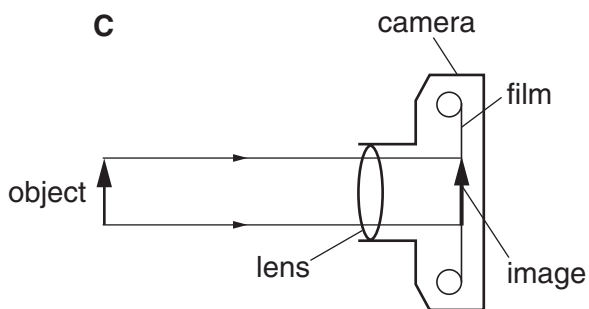
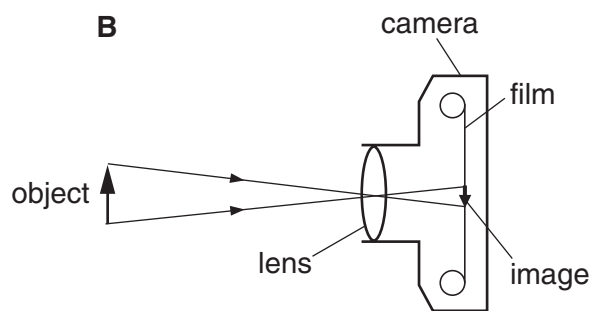
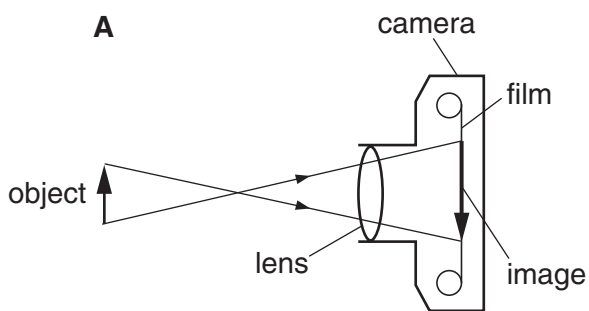
- A The amplitude of the light waves changes.
- B The colour of the light changes.
- C The frequency of the light waves changes.
- D The speed of the light changes.

34 A woman tunes her radio to a station broadcasting on 200 m.

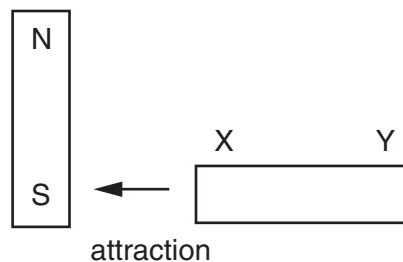
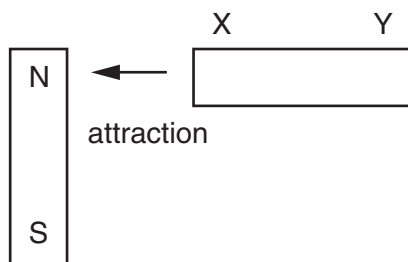
What does the 200 m tell her about the radio wave?

- A its amplitude
- B its frequency
- C its speed
- D its wavelength

35 Which diagram correctly shows rays passing through a camera lens?



- 36 A metal rod XY is placed near a magnet. End X is attracted when it is placed near to the north pole of the magnet, and also when it is placed near to the south pole.



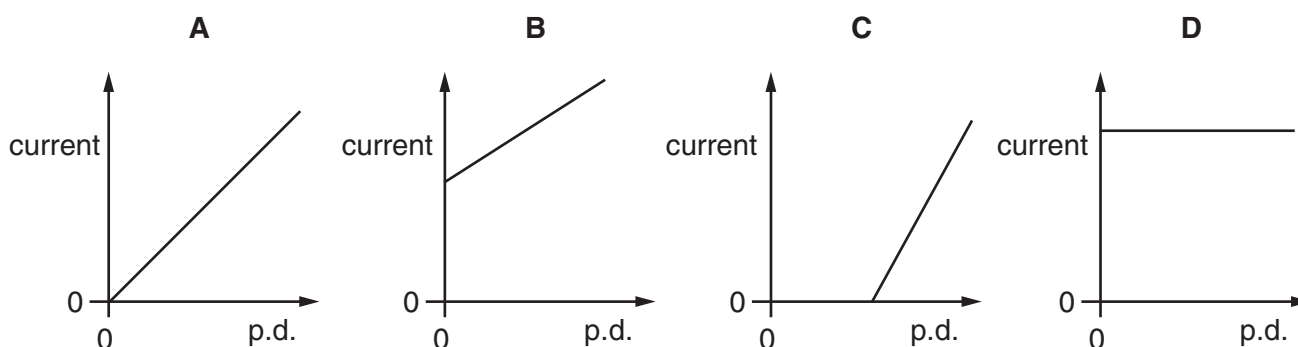
How does end Y behave when it is placed, in turn, near to the two poles of the magnet?

	Y near north pole	Y near south pole
A	attraction	attraction
B	attraction	repulsion
C	repulsion	attraction
D	repulsion	repulsion

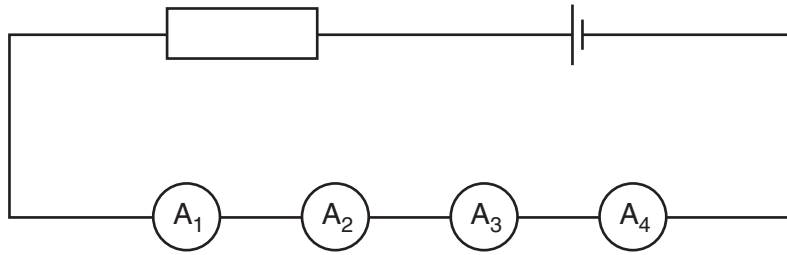
- 37 When the potential difference (p.d.) across a piece of resistance wire is changed, the current through the wire also changes.

The temperature of the wire is kept the same.

Which graph shows how the p.d. and current are related?



- 38 Two faulty ammeters and two perfect ammeters are connected in series in the circuit shown.



The readings on the ammeters are

$$A_1 \quad 2.9 \text{ A}$$

$$A_2 \quad 3.1 \text{ A}$$

$$A_3 \quad 3.1 \text{ A}$$

$$A_4 \quad 3.3 \text{ A}$$

Which two ammeters are faulty?

- A** A_1 and A_2 **B** A_1 and A_4 **C** A_2 and A_3 **D** A_3 and A_4
- 39 Which type of radiation can be stopped by a sheet of paper?
- A** α -particles
B β -particles
C γ -rays
D X-rays
- 40 The half-life of a radioactive substance is 5 hours. A sample is tested and found to contain 0.48 g of the substance.

How much of the substance was present in the sample 20 hours before the sample was tested?

- A** 0.03 g
B 0.12 g
C 1.92 g
D 7.68 g

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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 3	9 4	23 11	40 20	55 25	59 27	64 29	65 30	79 34	84 36
7 Li Lithium	9 Be Beryllium	23 Na Sodium	40 Ca Calcium	55 Mn Manganese	59 Co Cobalt	64 Cu Copper	65 Zn Zinc	79 Se Selenium	84 Kr Krypton
37 19	38 20	39 19	40 20	41 21	42 22	43 23	44 24	45 25	46 26
37 Rb Rubidium	38 Sr Strontium	39 K Potassium	40 Ca Calcium	41 Sc Scandium	42 Ti Titanium	43 V Vanadium	44 Cr Chromium	45 Mn Manganese	46 Fe Iron
55 37	56 38	57 39	58 40	59 41	60 42	61 43	62 44	63 45	64 46
55 Cs Caesium	56 Ba Barium	57 Fr Francium	58 Ra Radium	59 La Lanthanum	60 Ce Cerium	61 Pr Praseodymium	62 Nd Neodymium	63 Pm Promethium	64 Sm Samarium
133 55	137 56	139 57	140 58	141 59	142 60	143 61	144 62	145 63	146 64
133 Rb Rubidium	137 Sr Strontium	139 Y Yttrium	140 Zr Zirconium	141 Nb Niobium	142 Mo Molybdenum	143 Tc Technetium	144 Ru Ruthenium	145 Rh Rhodium	146 Pd Palladium
226 87	227 88	228 89	229 90	230 91	231 92	232 93	233 94	234 95	235 96
226 Fr Francium	227 Ra Radium	228 Ac Actinium	229 Th Thorium	230 Pa Protactinium	231 U Uranium	232 Np Neptunium	233 Pu Plutonium	234 Am Americium	235 Cm Curium
103 71	104 72	105 73	106 74	107 75	108 76	109 77	110 78	111 79	112 80
103 Lu Lutetium	104 Hf Hafnium	105 Ta Tantalum	106 W Tungsten	107 Re Rhenium	108 Os Osmium	109 Ir Iridium	110 Pt Platinum	111 Au Gold	112 Hg Mercury
173 71	174 72	175 73	176 74	177 75	178 76	179 77	180 78	181 79	182 80
173 Yb Ytterbium	174 Lu Lutetium	175 Tm Thulium	176 Yb Ytterbium	177 Er Erbium	178 Fm Fermium	179 Md Mendelevium	180 No Nobelium	181 Lr Lawrencium	182 103
183 85	184 86	185 87	186 88	187 89	188 90	189 91	190 92	191 93	192 94
183 At Astatine	184 Po Polonium	185 Bi Bismuth	186 Pb Lead	187 Tl Thallium	188 Pb Lead	189 Bi Bismuth	190 Po Polonium	191 At Astatine	192 Rn Radon
127 53	128 54	129 55	130 56	131 57	132 58	133 59	134 60	135 61	136 62
127 I Iodine	128 Xe Xenon	129 Sb Antimony	130 Te Tellurium	131 In Indium	132 Cd Cadmium	133 Ag Silver	134 Pd Palladium	135 Cu Copper	136 Zn Zinc
197 85	198 86	199 87	200 88	201 89	202 90	203 91	204 92	205 93	206 94
197 At Astatine	198 Po Polonium	199 Bi Bismuth	200 Pb Lead	201 Tl Thallium	202 Pb Lead	203 Bi Bismuth	204 Po Polonium	205 At Astatine	206 Rn Radon
167 68	168 69	169 70	170 71	171 72	172 73	173 74	174 75	175 76	176 77
167 Er Erbium	168 Tm Thulium	169 Yb Ytterbium	170 Lu Lutetium	171 Hf Hafnium	172 Ta Tantalum	173 W Tungsten	174 Re Rhenium	175 Os Osmium	176 Ir Iridium
100 102	101 103	102 104	103 106	104 109	105 114	106 121	107 138	108 175	109 286
100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium	104 103	105 103	106 103	107 103	108 103	109 103

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

Key

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.).