

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.

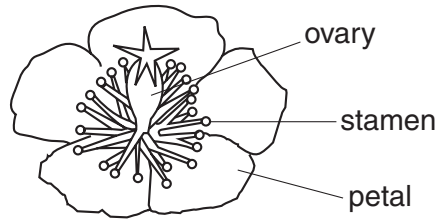
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

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.



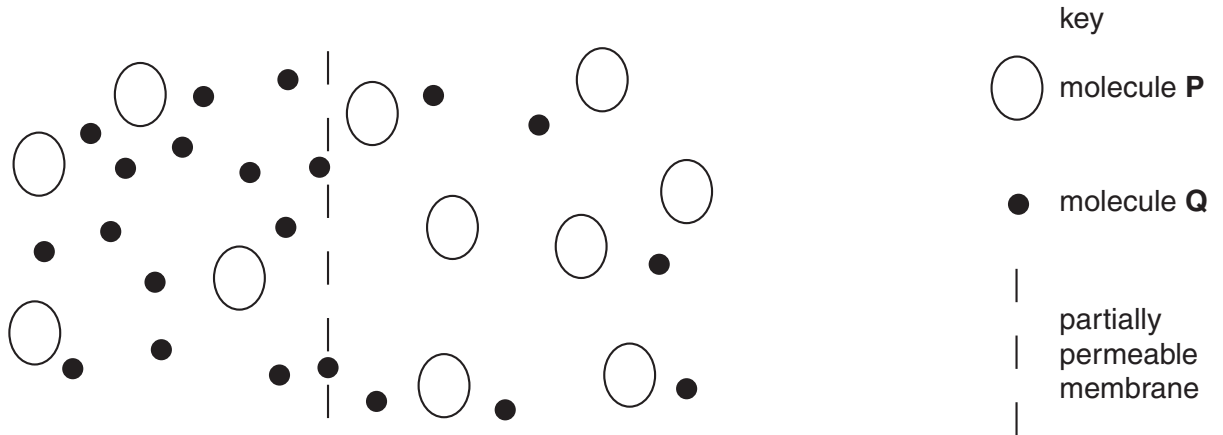
Use the key to identify the flower.

- 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**?

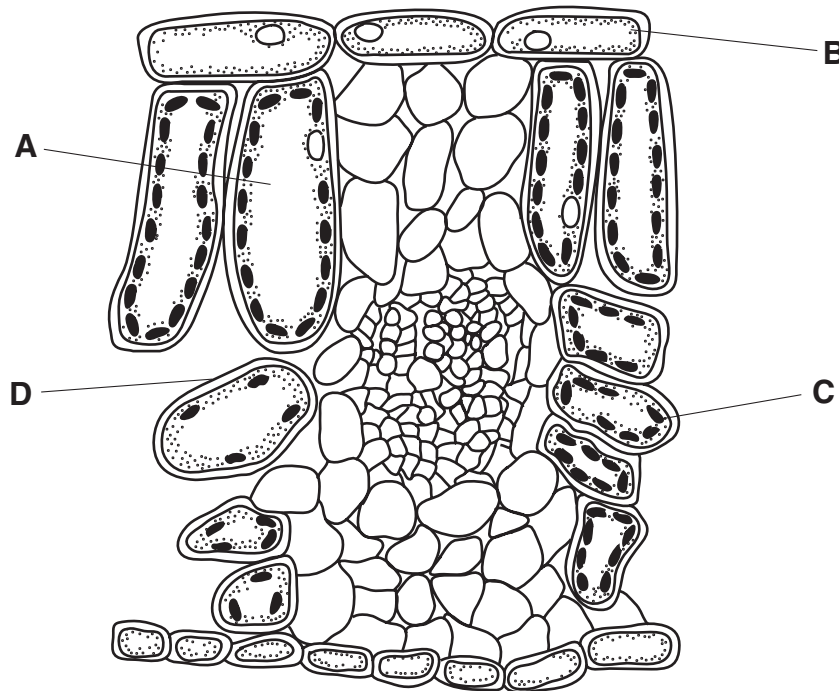
- A** amino acid
- B** starch
- C** sugar
- D** water

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.

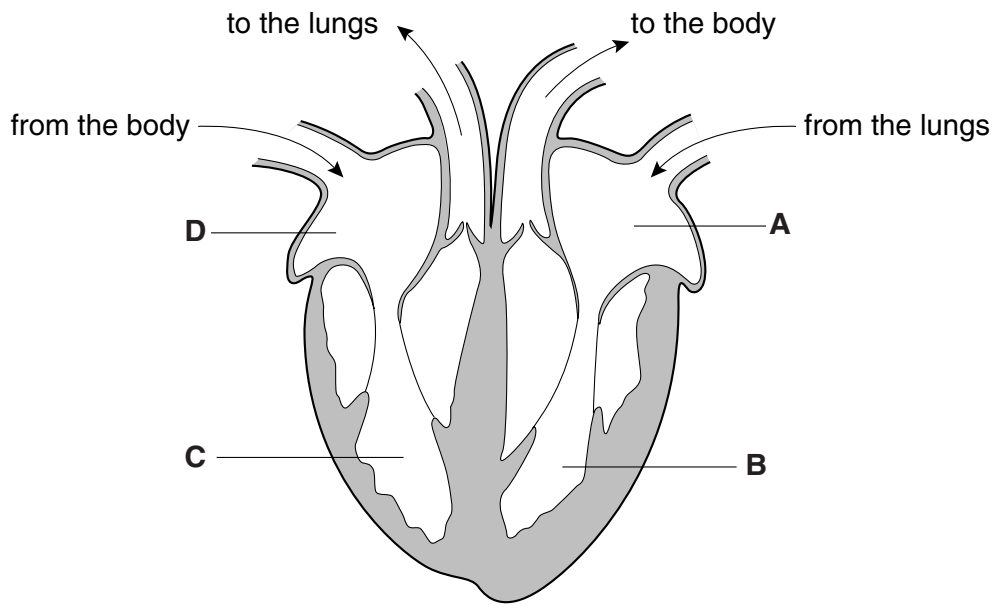
Where are carbohydrates made?



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

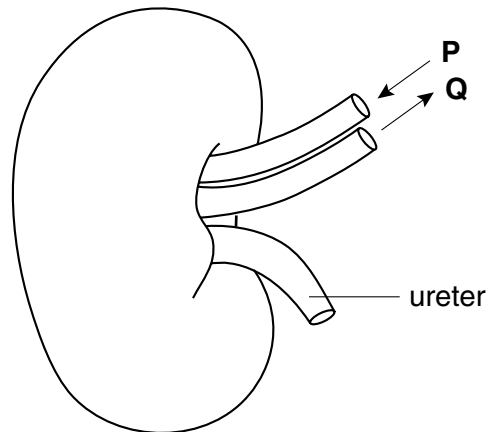
Which foods are the best value for body-building?

- 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

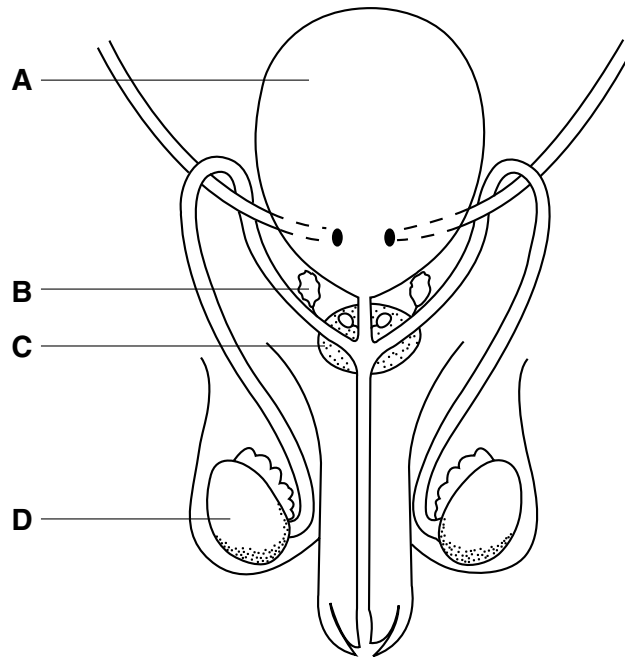
- A less urea and less oxygen.
 - B less urea and more oxygen.
 - C more urea and less oxygen.
 - D more urea and more oxygen.
- 11 A student placed four sets of seeds in different conditions.

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?



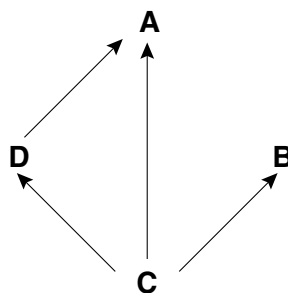
13 A heterozygous tall plant was crossed with a pure-breeding short plant of the same species. The resulting seeds were collected and grown to produce the next generation.

What were the approximate percentages of tall and short offspring?

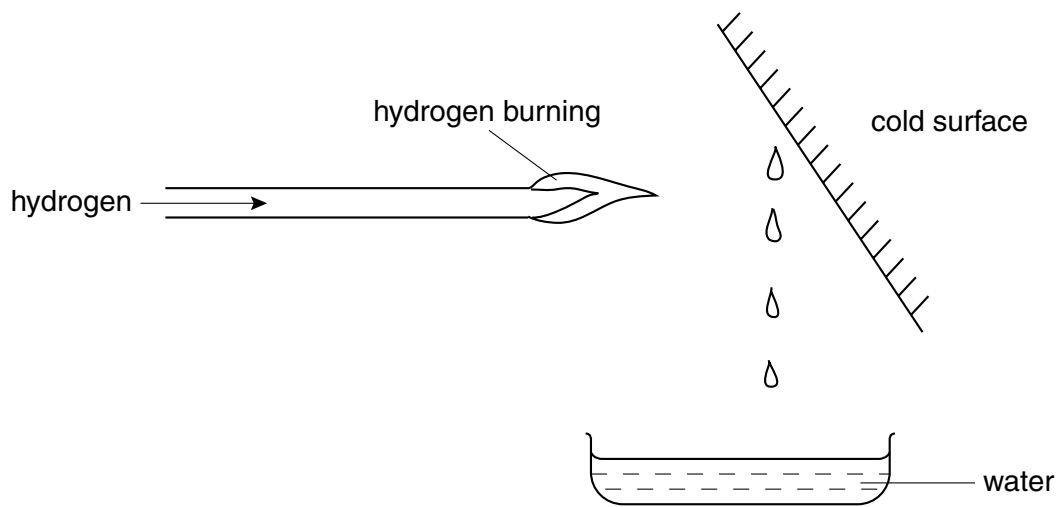
	percentage of tall offspring	percentage of short offspring
A	25	75
B	50	50
C	75	25
D	100	0

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?

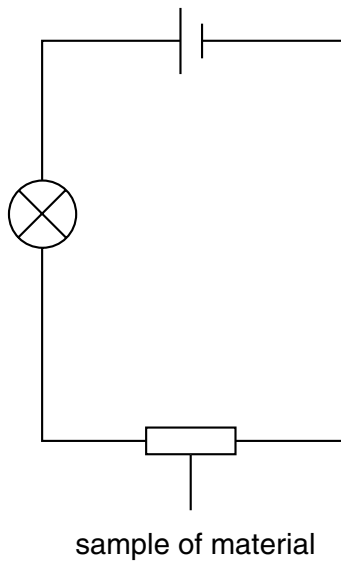
- A Atoms of water are formed.
- B The element water is formed.
- C The compound water is formed.
- D The mixture water is formed.

16 Element X can form 4 covalent bonds. Element Y can form 2 covalent bonds.

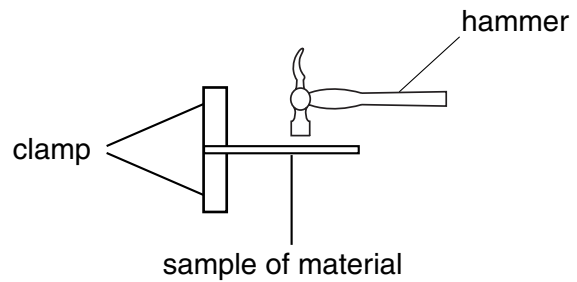
What is the simplest formula of the compound formed by X and Y?

- 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?

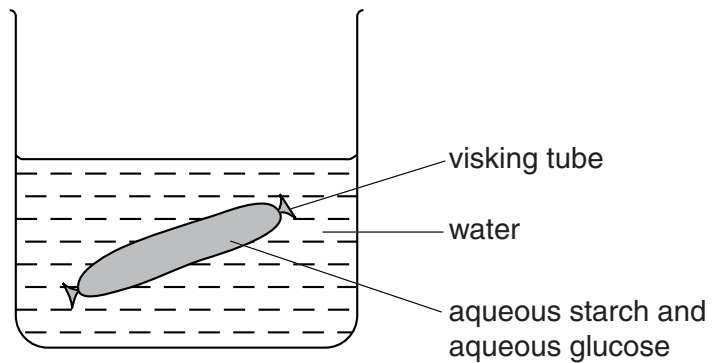
material	experiment 1	experiment 2
A	lamp does not light	bends
B	lamp does not light	breaks
C	lamp lights	bends
D	lamp lights	breaks

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.

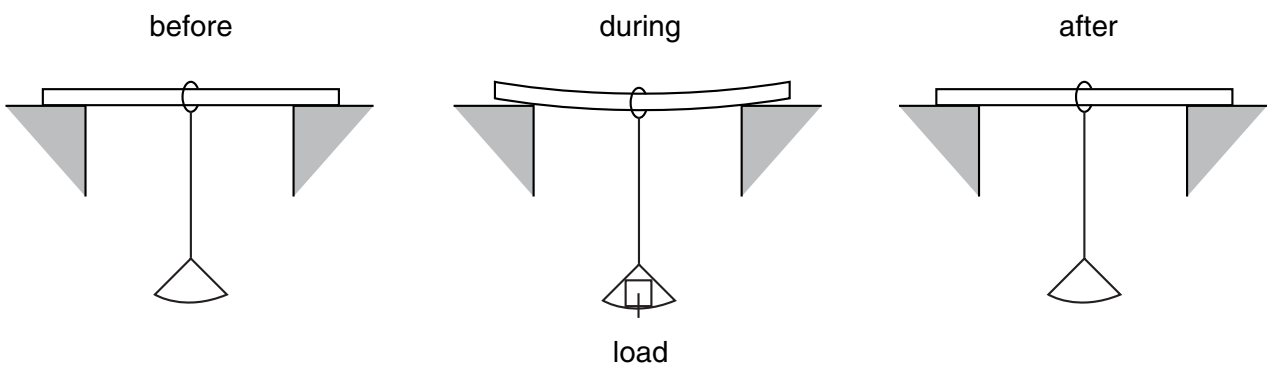


Iodine tests and Benedict's tests are then carried out. The results are shown below.

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

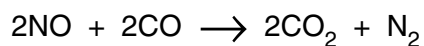
21 The names and formulae of four minerals are shown.

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	✗	✗

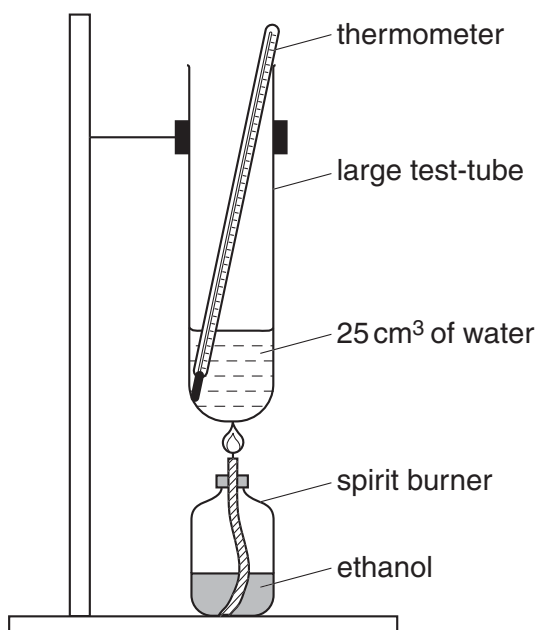
23 Tests on some 10 cm^3 samples of tap water give the following results.

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.

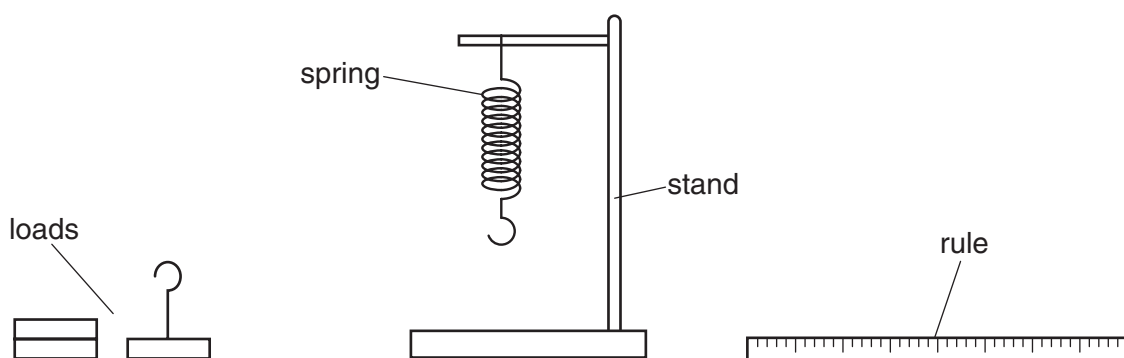


The mass of the burner and its contents is measured before and after the experiment. The thermometer is read before and after the experiment.

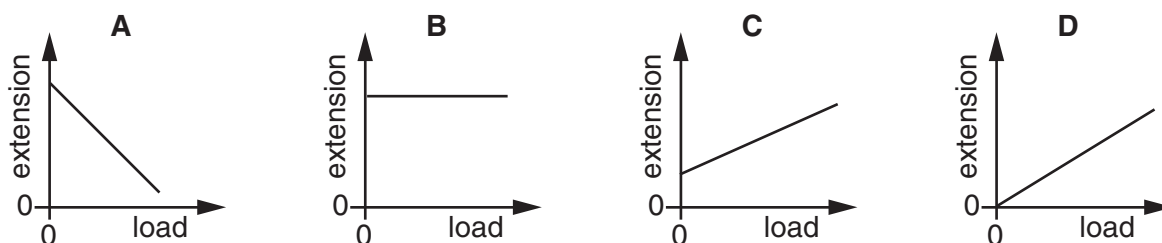
What are the expected results?

	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?

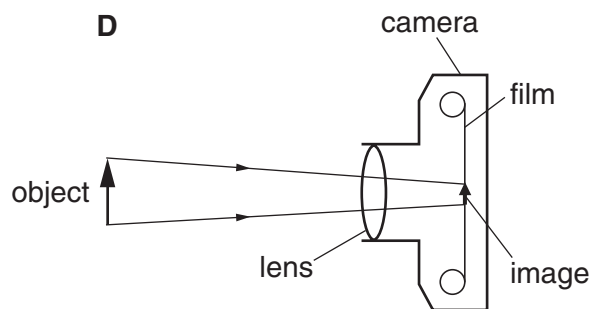
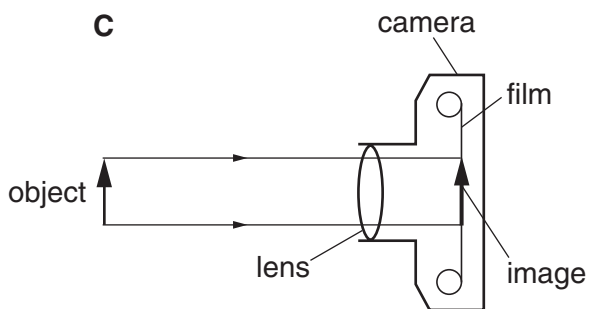
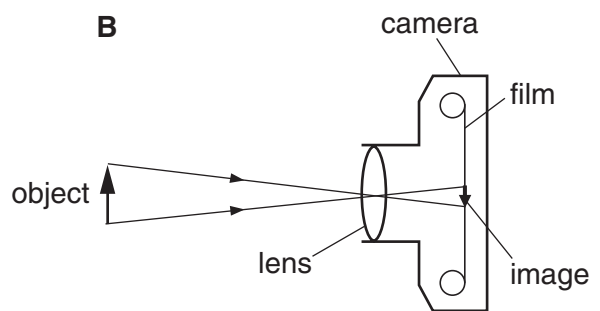
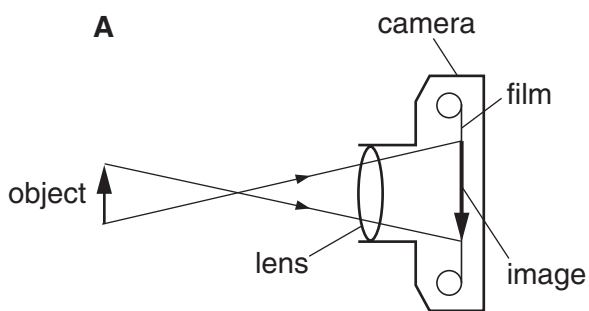
- A The amplitude of the light waves changes.
- B The colour of the light changes.
- C The frequency of the light waves changes.
- D The speed of the light changes.

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

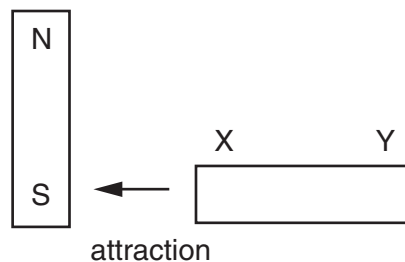
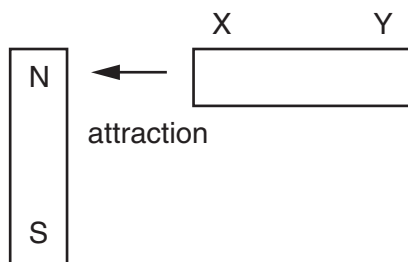
What does the 200 m tell her about the radio wave?

- 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.



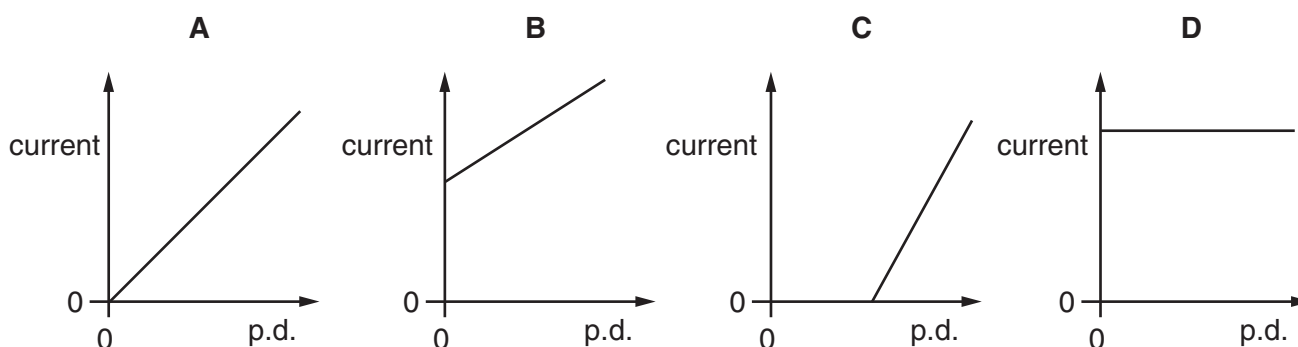
How does end Y behave when it is placed, in turn, near to the two poles of the magnet?

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

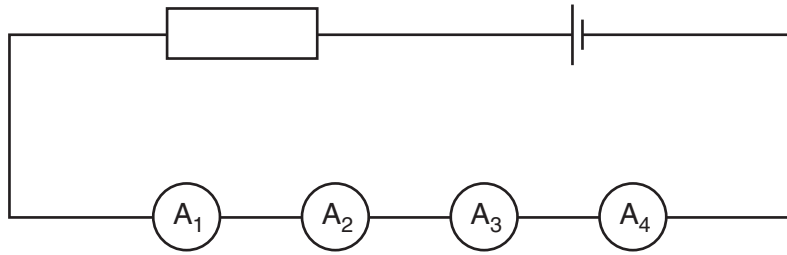
- 37 When the potential difference (p.d.) across a piece of resistance wire is changed, the current through the wire also changes.

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	VIII	IX	X						
		<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">1 H Hydrogen</td> </tr> </table>										1 H Hydrogen					
1 H Hydrogen																	
7 Li Lithium	9 Be Beryllium											4 He Helium					
3	4											2					
23 Na Sodium	24 Mg Magnesium											10 Ne Neon					
11	12											18 Ar Argon					
39 K Potassium	40 Ca Calcium	45 Sc Scandium	48 Ti Titanium	51 V Vanadium	52 Cr Chromium	55 Mn Manganese	56 Fe Iron	59 Co Cobalt	59 Ni Nickel	64 Cu Copper	65 Zn Zinc	70 Ga Gallium	73 Ge Germanium	75 As Arsenic	79 Se Selenium	80 Br Bromine	84 Kr Krypton
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
85 Rb Rubidium	88 Sr Strontium	89 Y Yttrium	91 Zr Zirconium	93 Nb Niobium	96 Mo Molybdenum	99 Tc Technetium	101 Ru Ruthenium	103 Rh Rhodium	106 Pd Palladium	108 Ag Silver	112 Cd Cadmium	115 In Indium	119 Sn Tin	122 Sb Antimony	128 Te Tellurium	127 I Iodine	131 Xe Xenon
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
133 Cs Caesium	137 Ba Barium	139 La Lanthanum	178 Hf Hafnium	181 Ta Tantalum	184 W Tungsten	186 Re Rhenium	190 Os Osmium	192 Ir Iridium	195 Pt Platinum	197 Au Gold	201 Hg Mercury	204 Tl Thallium	207 Pb Lead	209 Bi Bismuth	210 Po Polonium	210 At Astatine	210 Rn Radon
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
87 Fr Francium	88 Ra Radium	89 Ac Actinium											87				
226	227	227											†				
		<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">X</td> <td style="text-align: center;">b</td> </tr> </table>										a	X	b	†		
a	X	b															
		<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">a = relative atomic mass</td> <td style="text-align: center;">X = atomic symbol</td> <td style="text-align: center;">b = proton (atomic) number</td> </tr> </table>										a = relative atomic mass	X = atomic symbol	b = proton (atomic) number			
a = relative atomic mass	X = atomic symbol	b = proton (atomic) number															
		<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">*58-71 Lanthanoid series</td> <td style="text-align: center;">†90-103 Actinoid series</td> </tr> </table>										*58-71 Lanthanoid series	†90-103 Actinoid series				
*58-71 Lanthanoid series	†90-103 Actinoid series																
140 Ce Cerium	141 Pr Praseodymium	144 Nd Neodymium	150 Sm Samarium	152 Eu Europium	157 Gd Gadolinium	159 Tb Terbium	162 Dy Dysprosium	165 Ho Holmium	167 Er Erbium	169 Tm Thulium	173 Yb Ytterbium	175 Lu Lutetium					
58	59	60	62	63	64	65	66	67	68	69	70	71					
232 Th Thorium	238 Pa Protactinium	238 U Uranium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium					
90	91	92	94	95	96	97	98	99	100	101	102	103					

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