

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.

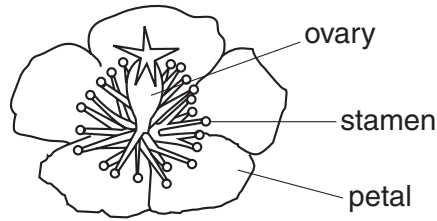
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

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.



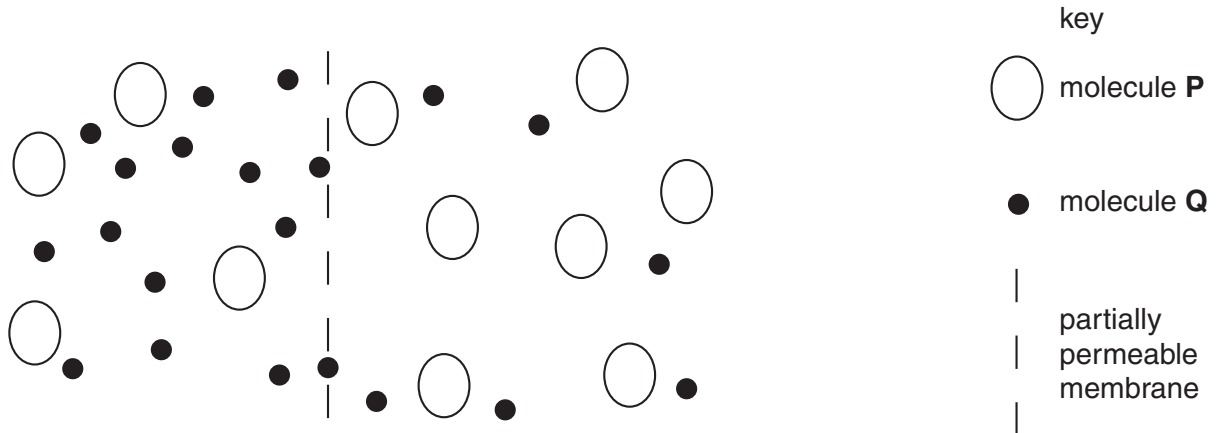
Use the key to identify the flower.

- 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**?

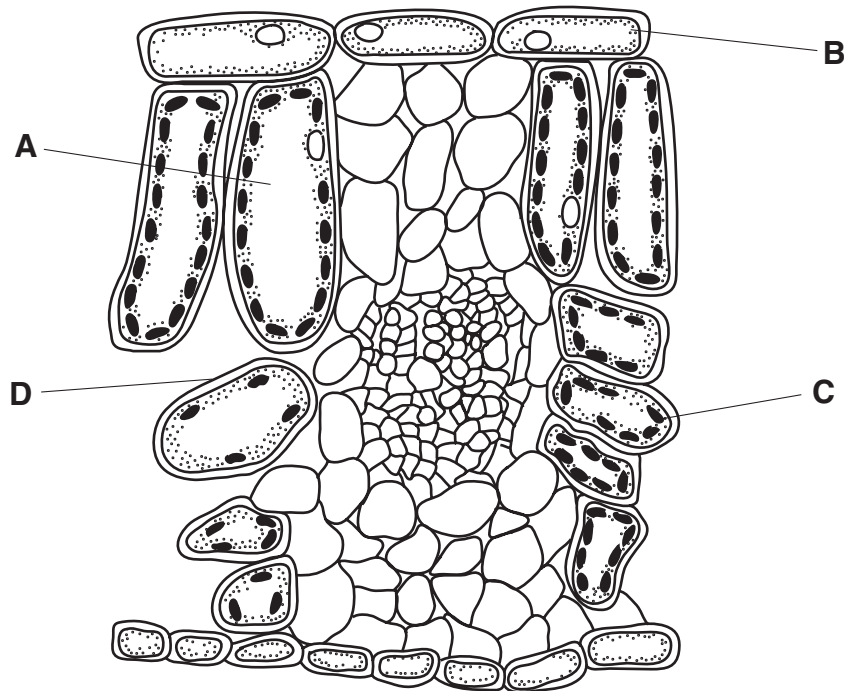
- A** amino acid
- B** starch
- C** sugar
- D** water

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.

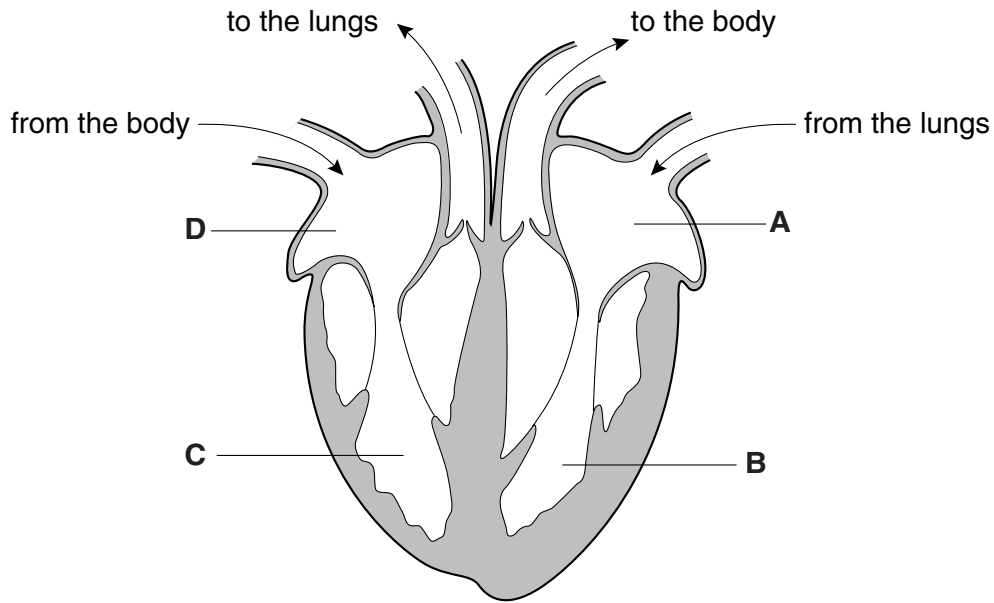
Where are carbohydrates made?



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

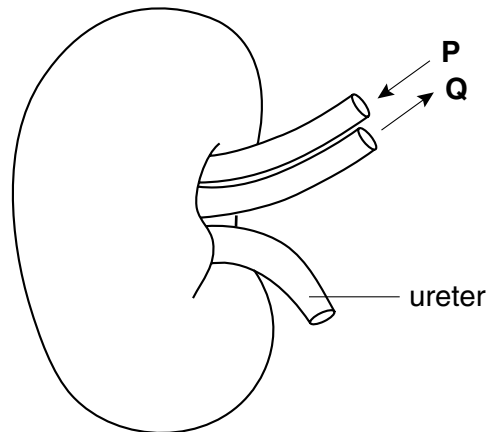
Which foods are the best value for body-building?

- 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

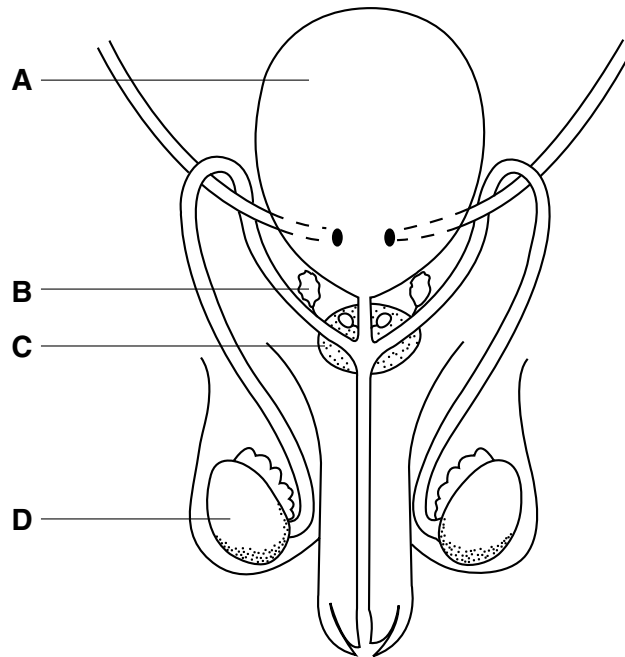
- A less urea and less oxygen.
 - B less urea and more oxygen.
 - C more urea and less oxygen.
 - D more urea and more oxygen.
- 11 A student placed four sets of seeds in different conditions.

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?



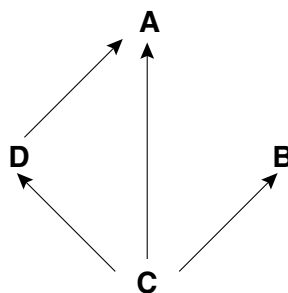
13 A heterozygous tall plant was crossed with a pure-breeding short plant of the same species. The resulting seeds were collected and grown to produce the next generation.

What were the approximate percentages of tall and short offspring?

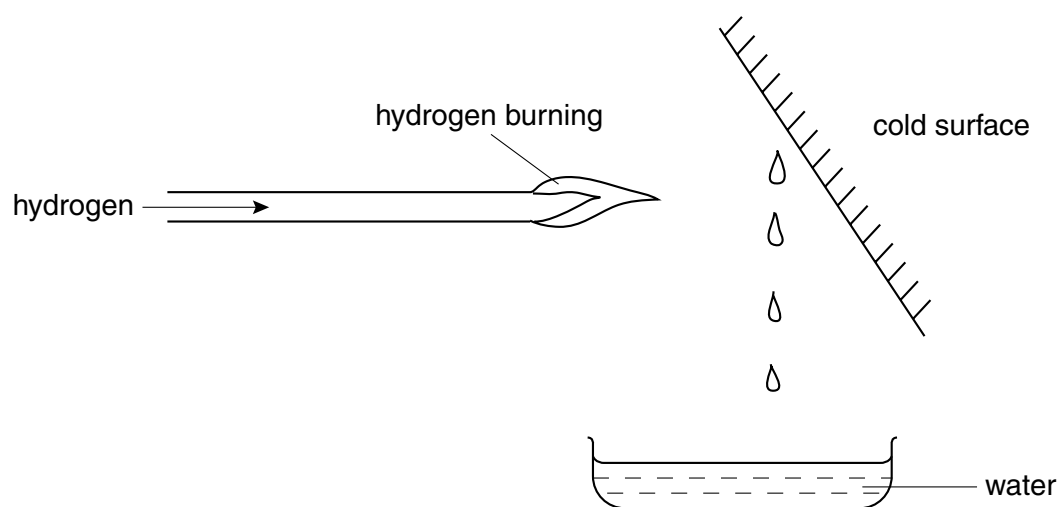
	percentage of tall offspring	percentage of short offspring
A	25	75
B	50	50
C	75	25
D	100	0

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.



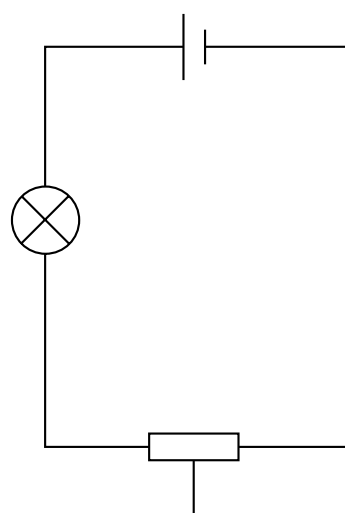
What happens?

- 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?

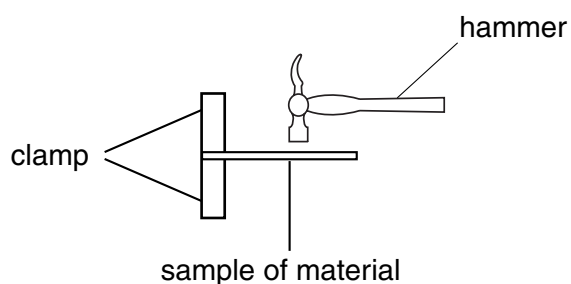
- A XY_2
- B X_2Y
- C X_2Y_4
- D X_4Y_2

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



sample of material

experiment 1



sample of material

experiment 2

The results are given in the table.

Which material is a metal?

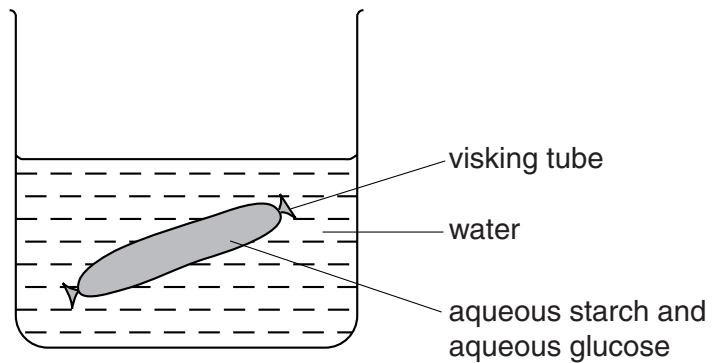
material	experiment 1	experiment 2
A	lamp does not light	bends
B	lamp does not light	breaks
C	lamp lights	bends
D	lamp lights	breaks

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.

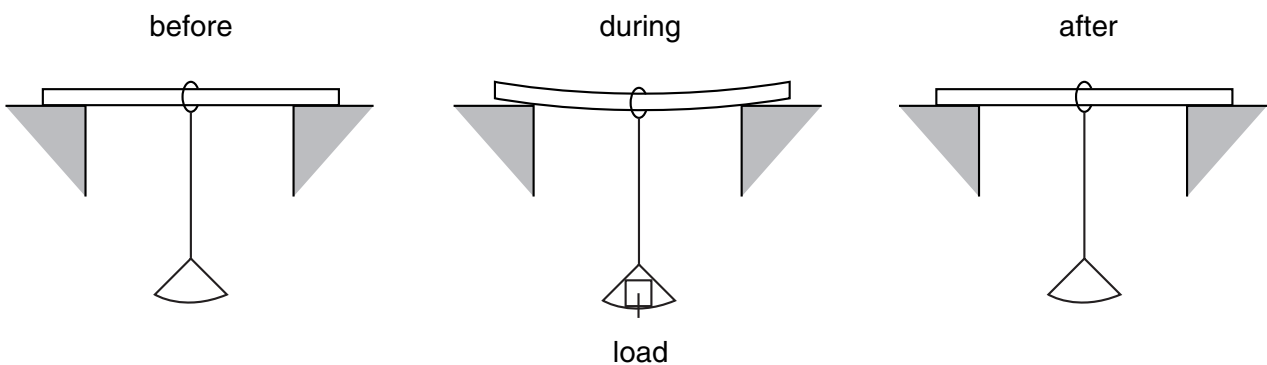


Iodine tests and Benedict's tests are then carried out. The results are shown below.

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

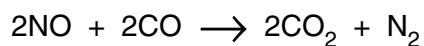
21 The names and formulae of four minerals are shown.

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	✗	✗

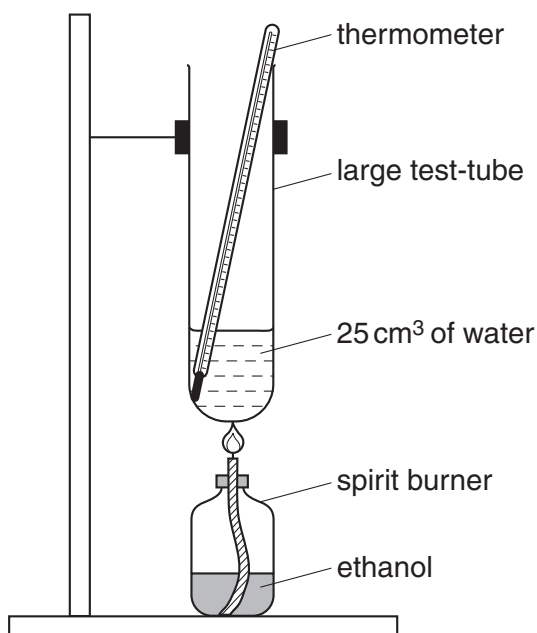
23 Tests on some 10 cm^3 samples of tap water give the following results.

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

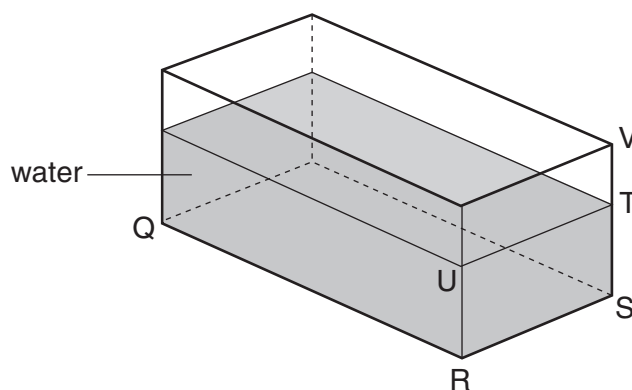
27 The order of reactivity of three metals **X**, **Y** and **Z** is shown.

least reactive \longrightarrow most reactive
X **Y** **Z**

Which statement is correct?

- A **X** displaces **Y** from its salts.
- B **X** displaces **Z** from its salts.
- C **Y** displaces **Z** from its salts.
- D **Z** displaces **X** from its salts.

28 A glass tank contains some water.



The length QR and the width RS of the tank are known.

What other distance needs to be measured in order to be able to calculate the volume of the water?

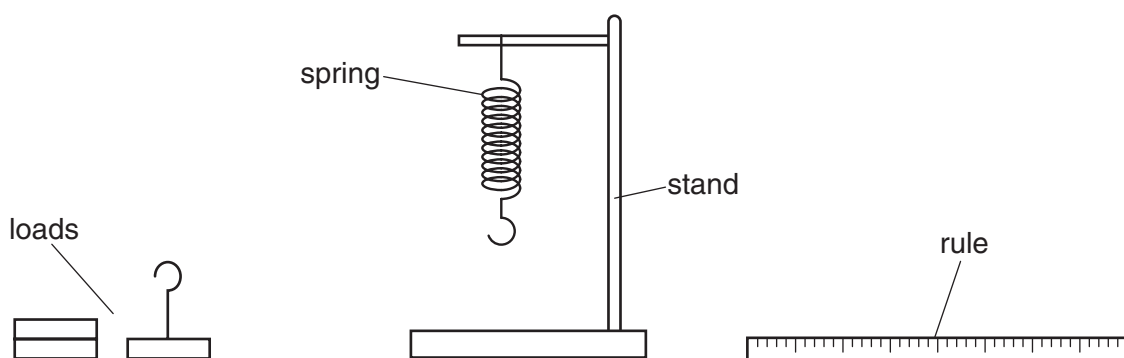
- A ST B SV C TU D TV

29 A tunnel has a length of 50 km. A car takes 20 min to travel between the two ends of the tunnel.

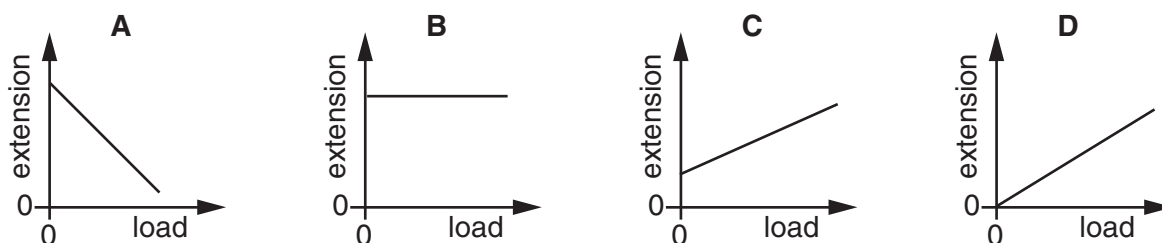
What is the average speed of the car?

- A 2.5 km/h
- B 16.6 km/h
- C 150 km/h
- D 1000 km/h

- 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?

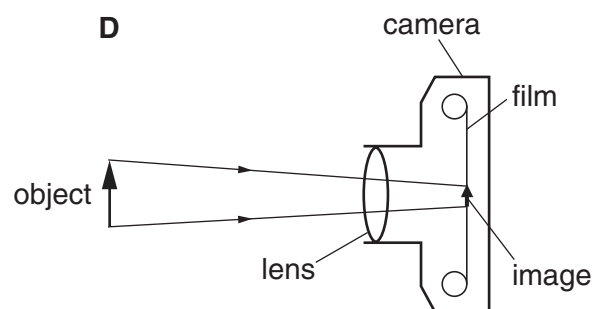
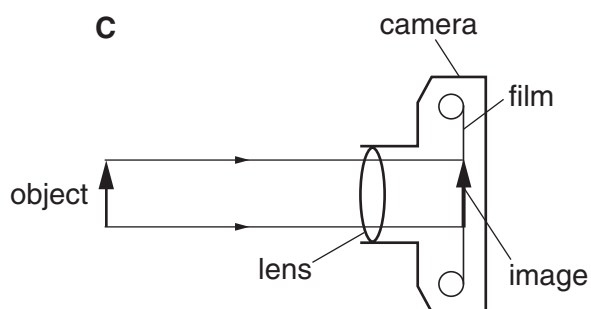
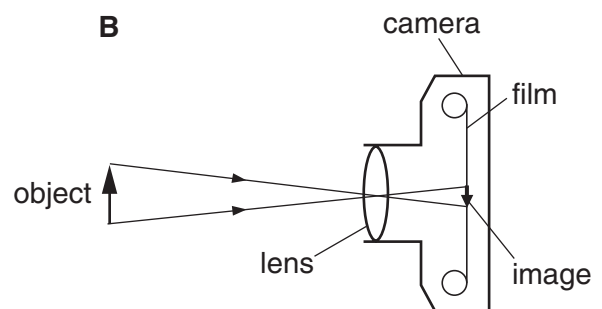
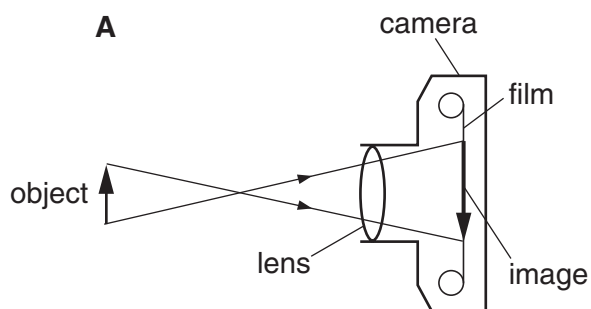
- A The amplitude of the light waves changes.
- B The colour of the light changes.
- C The frequency of the light waves changes.
- D The speed of the light changes.

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.



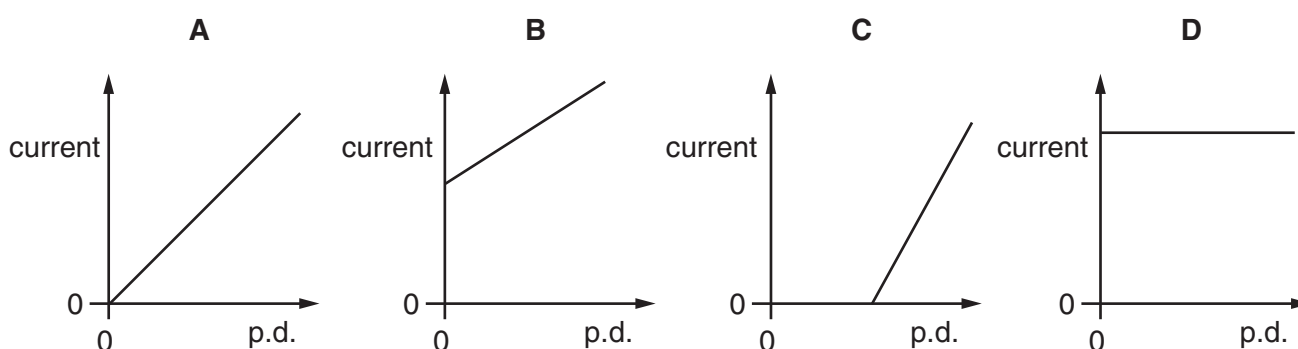
How does end Y behave when it is placed, in turn, near to the two poles of the magnet?

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

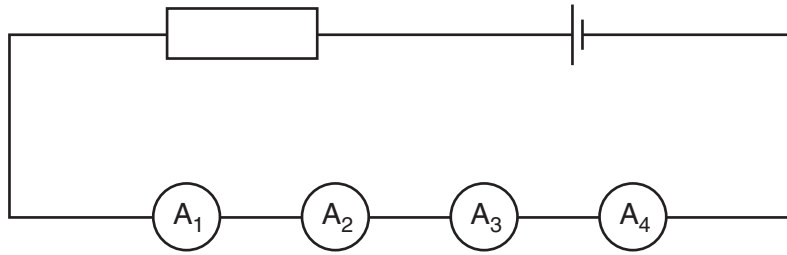
- 37 When the potential difference (p.d.) across a piece of resistance wire is changed, the current through the wire also changes.

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	O	
7	9	1							4	2
Li Lithium 3	Be Beryllium 4	H Hydrogen 1							He Helium 2	Ne Neon 10
23	24							16	19	20
Na Sodium 11	Mg Magnesium 12							O Oxygen 8	F Fluorine 9	Ne Neon 10
39	40							32	35.5	40
K Potassium 19	Ca Calcium 20							S Sulphur 16	Cl Chlorine 17	Ar Argon 18
85	88							79	80	84
Rb Rubidium 37	Sr Strontium 38							Se Selenium 34	Br Bromine 35	Kr Krypton 36
133	137							128	127	131
Cs Caesium 55	Ba Barium 56							Te Tellurium 52	I Iodine 53	Xe Xenon 54
226	227							207	209	209
Fr Francium 87	Ra Radium 88							Pb Lead 82	Bi Bismuth 83	Rn Radon 86
*58-71 Lanthanoid series										
†90-103 Actinoid series										
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;"> a X b </div> <div style="text-align: left;"> a = relative atomic mass X = atomic symbol b = proton (atomic) number </div> </div>										
11	12	13	14	15	16	17	18	19	20	
B Boron 5	C Carbon 6	Al Aluminium 13	Si Silicon 14	P Phosphorus 15	S Sulphur 16	Cl Chlorine 17	Ar Argon 18	K Potassium 19	Ca Calcium 20	
27	28	29	30	31	32	33	34	35	36	
Ga Gallium 31	Ge Germanium 32	Cu Copper 29	Zn Zinc 30	As Arsenic 33	Se Selenium 34	Br Bromine 35	Kr Krypton 36	Rb Rubidium 37	Sr Strontium 38	
70	73	74	75	76	77	78	79	80	81	
In Indium 49	Sn Tin 50	Ag Silver 47	Cd Cadmium 48	Sb Antimony 51	Te Tellurium 52	I Iodine 53	Xe Xenon 54	Ba Barium 56	La Lanthanum 57	
115	119	108	112	122	128	127	131	137	139	
Tl Thallium 81	Pb Lead 82	Au Gold 79	Hg Mercury 80	Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86	Fr Francium 87	Ra Radium 88	
204	207	197	201	209	209	209	209	226	227	
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	
140	141	144	150	152	157	162	165	167	173	
Ce Cerium 58	Pr Praseodymium 59	Nd Neodymium 60	Pm Promethium 61	Sm Samarium 62	Eu Europium 63	Gd Gadolinium 64	Ho Holmium 67	Er Erbium 68	Lu Lutetium 71	
232	238	238	238	238	238	238	238	238	238	
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	
162	165	167	169	173	173	173	173	173	173	
Dy Dysprosium 66	Ho Holmium 67	Er Erbium 68	Tm Thulium 69	Yb Ytterbium 70	Lu Lutetium 71	La Lanthanum 57	Ce Cerium 58	Pr Praseodymium 59	Nd Neodymium 60	
204	207	209	209	209	209	209	209	226	227	
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	

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