

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE

5129/01

Paper 1 Multiple Choice

May/June 2003

1 hour

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.

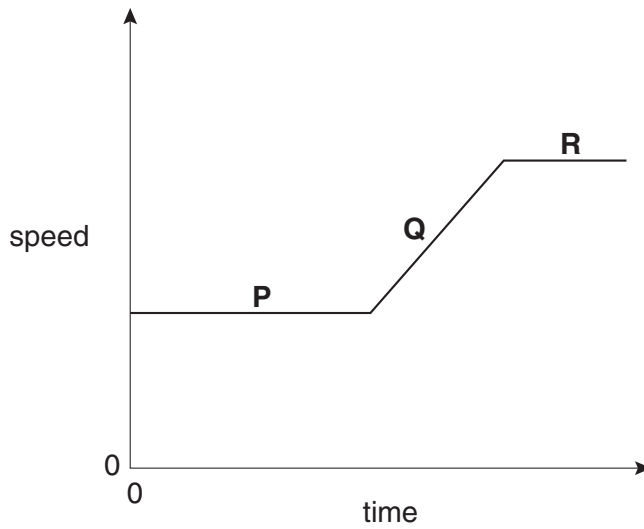
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

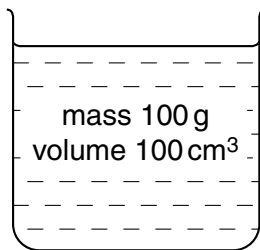
This document consists of **16** printed pages.

- 1 The graph shows how the speed of a car changes over a period of time.

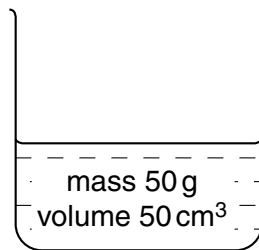


Which of the following is true?

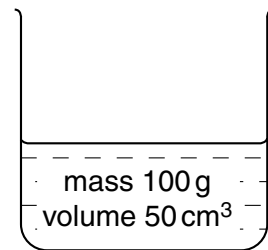
- A at **P** the car is at rest
 - B at **Q** the car has a non uniform acceleration
 - C at **Q** the car has uniform acceleration
 - D at **R** the car is accelerating
- 2 The beakers shown contain three different liquids



liquid 1



liquid 2



liquid 3

Which statement about the densities of the liquids is correct?

- A Liquid 1 has twice the density of liquid 3.
- B Liquid 3 has twice the density of liquid 2.
- C The liquids all have different densities.
- D The liquids all have the same densities.

3 Which of these objects will experience an **elastic** deformation?

- A a car damaged in a collision
- B a football being kicked
- C a log hit by an axe
- D a target hit by an arrow

4 A bank of solar cells is used to supply electricity to a house.

What form of energy is converted into electrical energy by the solar cells?

- A chemical energy
- B light energy
- C nuclear energy
- D thermal energy

5 To create a temperature scale two fixed points, the ice point and the steam point, are needed.

Which of the following is used to determine the ice point?

- A the temperature at which air liquefies
- B the temperature at which sea water freezes
- C the temperature of ice in a freezer
- D the temperature of melting ice

6 X-rays are one form of electromagnetic radiation.

Which of the following is correct for X-rays?

	type of wave	speed of wave in vacuo
A	longitudinal	340 m/s
B	longitudinal	3×10^8 m/s
C	transverse	340 m/s
D	transverse	3×10^8 m/s

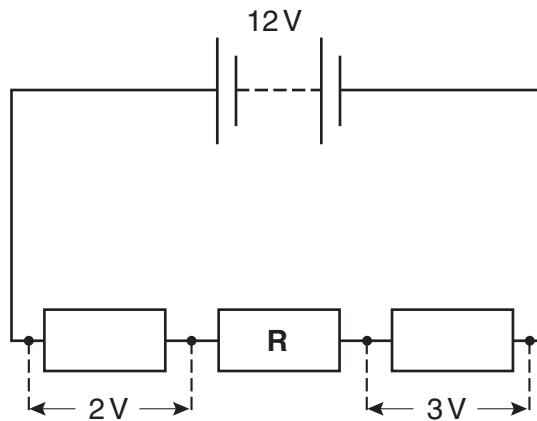
- 7 Which of the following proves that a piece of metal is already a magnet?
- A A magnet is attracted to it.
 - B Both ends of a compass needle are attracted to it.
 - C Copper wire is attracted to it.
 - D One end of a compass needle is repelled by it.

- 8 A current of 2 A is flowing through a conductor.

How long does it take for 10 C of charge to pass any point?

- A 20 s
 - B 12 s
 - C 5 s
 - D 0.2 s
- 9 A battery of e.m.f. 12 V is connected in series with three resistors.

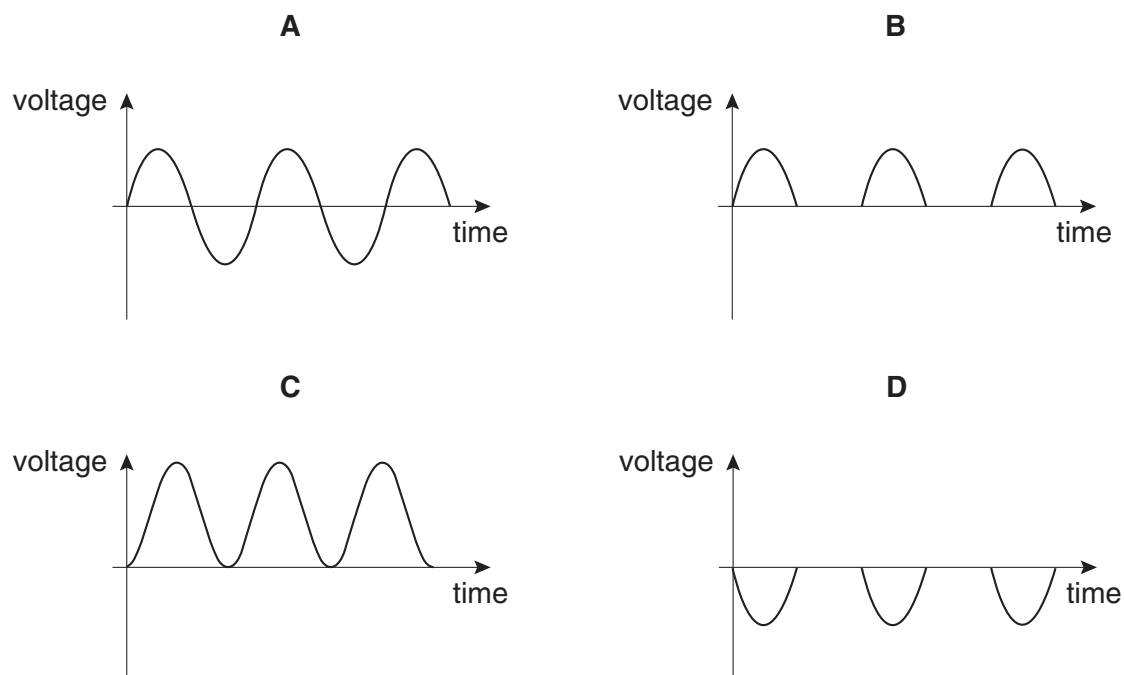
The p.d. across two of the resistors is shown.



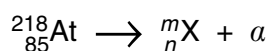
What is the p.d. across the third resistor, **R**?

- A 3.5 V
 - B 5 V
 - C 7 V
 - D 10 V
- 10 An electric cooker is connected to the mains by a 3 core cable.
- When the cooker is working correctly which wires carry the same current?
- A the live, the neutral and the earth
 - B the live and the earth
 - C the neutral and the earth
 - D the neutral and the live

- 11 Which graph shows how the voltage output of a simple a.c. generator varies with time?



- 12 The element astatine, At, can decay by alpha emission as shown by the equation below.



Which answer corresponds to the value of m and n ?

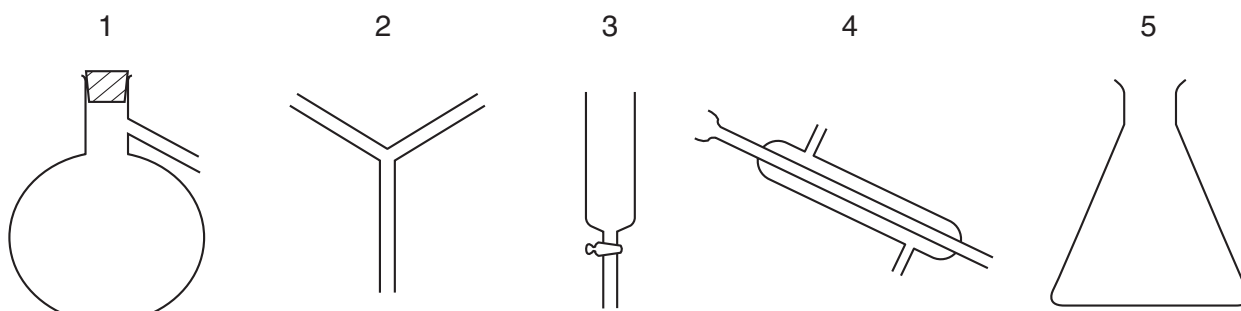
	m	n
A	214	83
B	218	84
C	218	86
D	222	87

- 13 In a sulphur nucleus there are 16 positively charged particles and 18 neutral particles.

Which are its proton and nucleon numbers?

	proton number	nucleon number
A	16	18
B	16	34
C	18	16
D	18	34

14 The diagram shows some laboratory apparatus.



Which are needed to produce and collect pure water from seawater?

- A 1 and 2 and 4
- B 1 and 4 and 5
- C 2 and 5
- D 3 and 5

15 Aluminium has the symbol ${}_{13}^{27}\text{Al}$.

Which is a correct line of data for an atom of aluminium?

	number of		
	protons	electrons	neutrons
A	13	14	14
B	13	13	14
C	13	14	27
D	14	13	27

16 Ionic compounds have high melting points because

- A the ions are held together by strong electrostatic forces.
- B the ions have inert gas structures.
- C the electrons are attracted to the cations.
- D metals transfer electrons to non-metals.

17 What is always produced during photosynthesis?

- A carbon dioxide
- B methane
- C oxygen
- D water vapour

18 When two liquids are mixed, a solution with a pH value of 7 is formed.

Which of the following are the pH values of the two liquids?

	first liquid pH	second liquid pH
A	5	2
B	5	12
C	6	1
D	14	7

19 Which of the following describes a step in the preparation of insoluble barium sulphate from aqueous barium chloride and dilute sulphuric acid?

- A** Add dilute sulphuric acid until no more gas is produced.
- B** Add Universal Indicator.
- C** Collect the precipitate of barium sulphate by filtration.
- D** Evaporate the filtrate until it crystallises.

20 The table shows some properties of four metals.

Which metal is in Group I of the Periodic Table?

metal	density	hard or soft
A	low	soft
B	low	hard
C	high	soft
D	high	hard

21 Which deduction about astatine, At, can be made from its position in Group VII?

- A** It forms covalent compounds with sodium.
- B** It is displaced from aqueous potassium astatide, KAt, by chlorine.
- C** It is a gas.
- D** It is more reactive than iodine.

22 The table gives information on four metals and some of their compounds.

metal	action of dilute sulphuric acid on metal	effect of hydrogen on heated oxide	action of metal on solution of the sulphate of metal J
G	hydrogen evolved	reduced	no reaction
H	no reaction	reduced	no reaction
I	hydrogen evolved	no action	metal J formed
J	hydrogen evolved	no action	no reaction

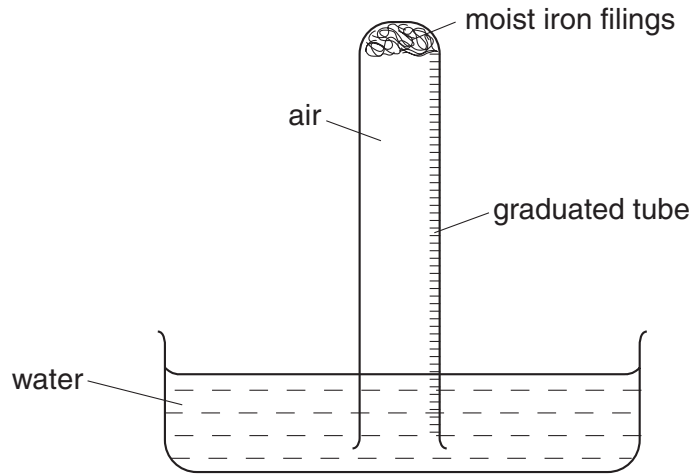
What is the order of reactivity of these metals?

	most reactive \rightarrow least reactive			
A	H	G	I	J
B	H	J	G	I
C	I	J	G	H
D	I	H	G	J

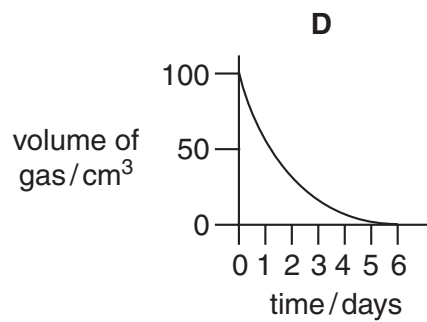
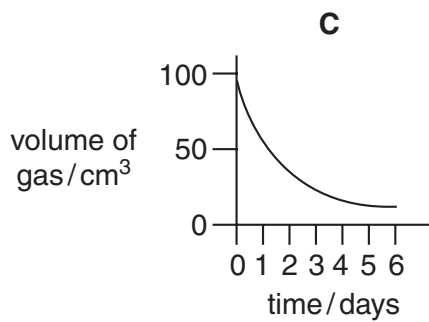
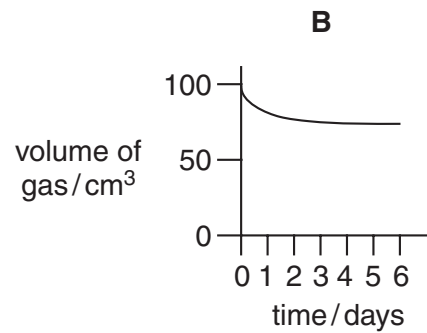
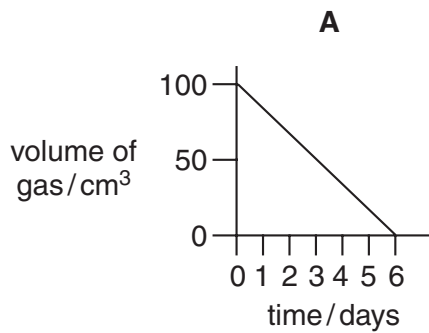
23 Which statement about the production of iron from haematite is correct?

- A** Coke is used to oxidise the slag.
- B** Limestone is used to remove basic impurities.
- C** Molten iron floats on slag at the furnace base.
- D** The haematite is reduced by carbon monoxide.

- 24 The apparatus shown was set up with 100 cm^3 volume of air in the tube. The volume of gas in the tube was measured at intervals for six days.



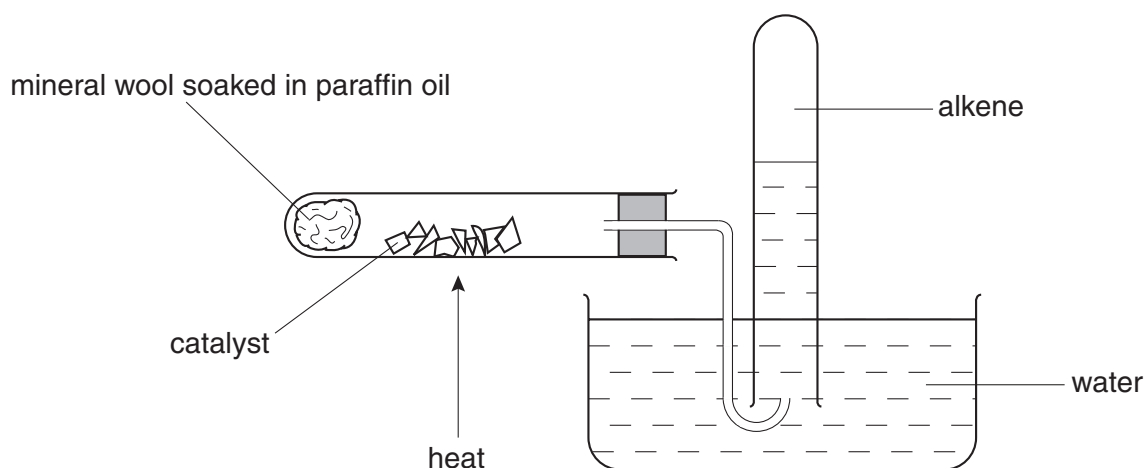
Which graph best represents how the volume of gas changes with time?



- 25 What is the main constituent of natural gas?

- A ethane
- B helium
- C hydrogen
- D methane

26 The apparatus shown is used in the laboratory to form alkenes from paraffin oil.

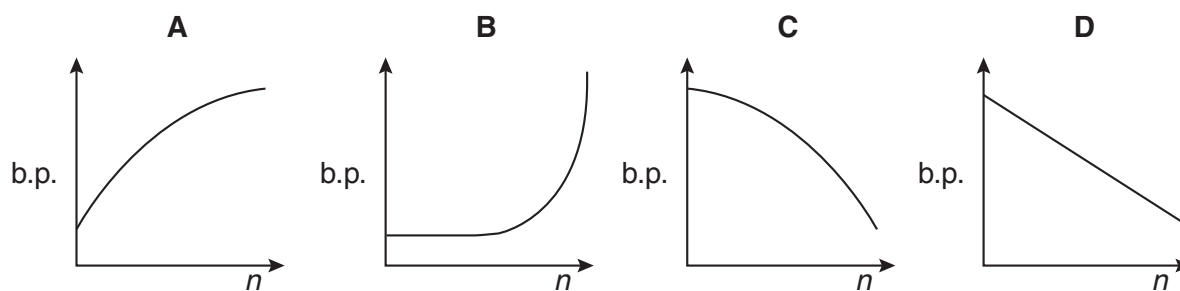


What type of reaction is taking place?

- A combustion
- B cracking
- C distillation
- D reduction

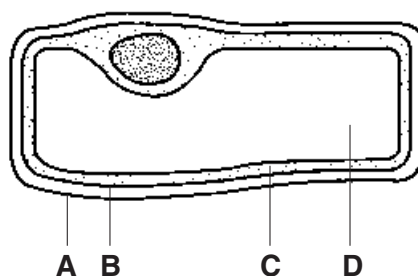
27 In the alkane series of hydrocarbons, C_nH_{2n+2} , the boiling point (b.p.) of the compound increases as n increases.

Which graph correctly represents this effect?

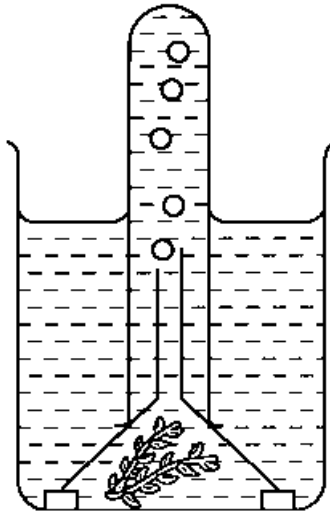


28 The diagram shows a cell from the epidermis of an onion.

Which part allows some, but not all, dissolved substances to pass into or out of the cell?



- 29 When seeds begin to germinate in the soil, how is the stored food made available to the new root and shoot?
- A diffusion
 B enzyme action
 C osmosis
 D photosynthesis
- 30 The diagram shows an experiment to investigate the volume of gas produced by an aquatic plant under different conditions of light intensity and temperature.



Which conditions result in the greatest production of gas by the plant?

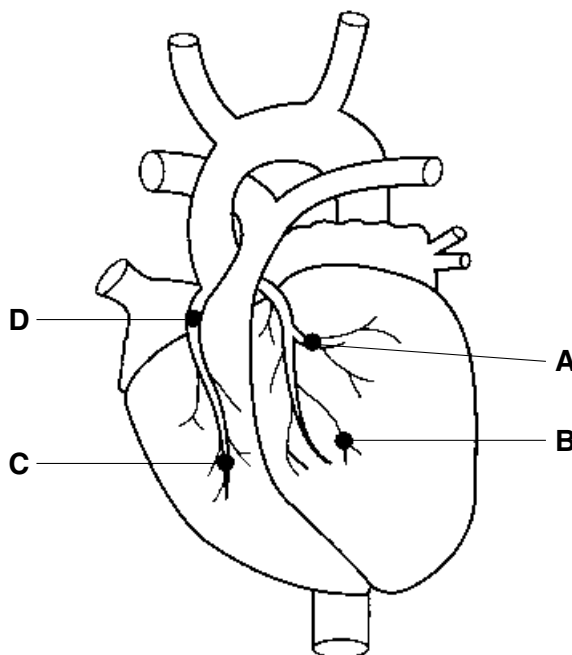
	light intensity	temperature / °C
A	high	5
B	low	5
C	high	25
D	low	25

- 31 The table shows changes in the concentrations of blood components as the blood flows through an organ.

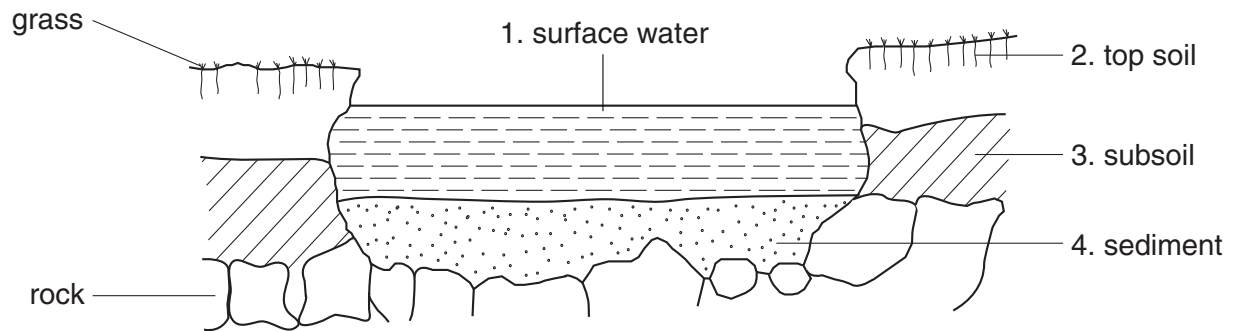
blood component	change in concentration
carbon dioxide	increased
glucose	increased
oxygen	reduced
urea	increased

Which organ has the blood passed through?

- A brain
 B kidney
 C liver
 D stomach
- 32 Where does most transpiration in a plant take place?
- A cuticle
 B root hairs
 C stomata
 D xylem
- 33 The diagram shows the coronary arteries on the surface of the human heart.
 At which point would a blockage result in the most serious damage?



34 The diagram shows a vertical section through a river and its banks.

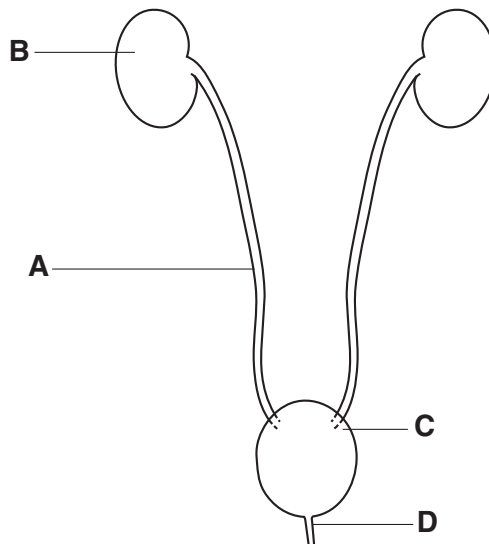


Where do microorganisms need to respire **anaerobically**?

- A 1 and 2
- B 2 and 3
- C 3 and 4
- D 4 and 1

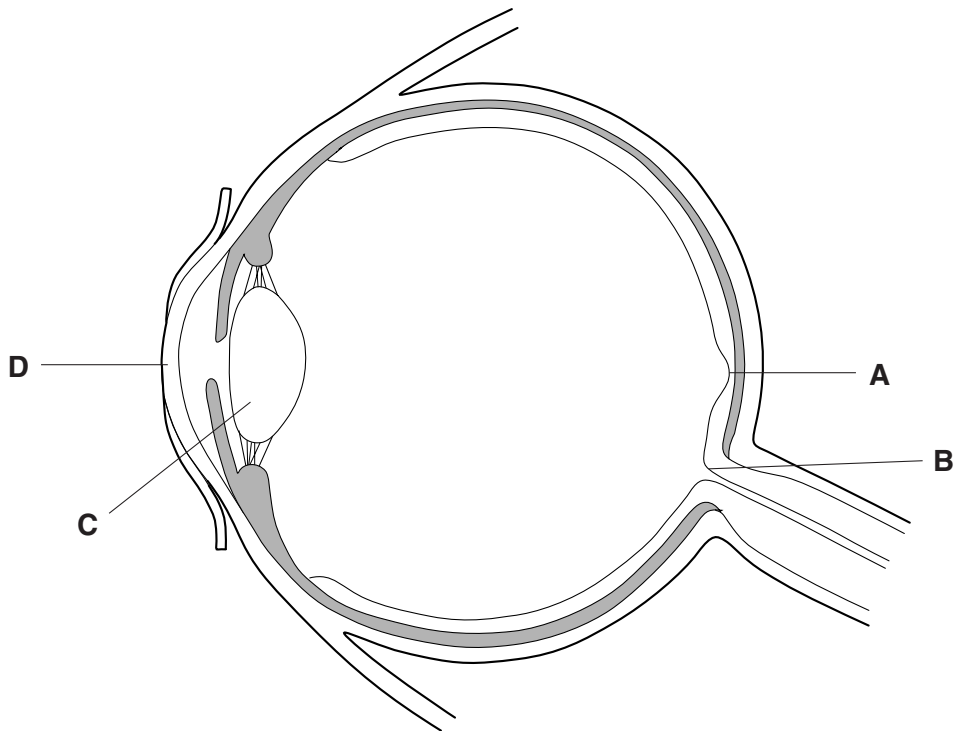
35 The diagram shows the urinary system.

Which part of this system removes urea from the blood?

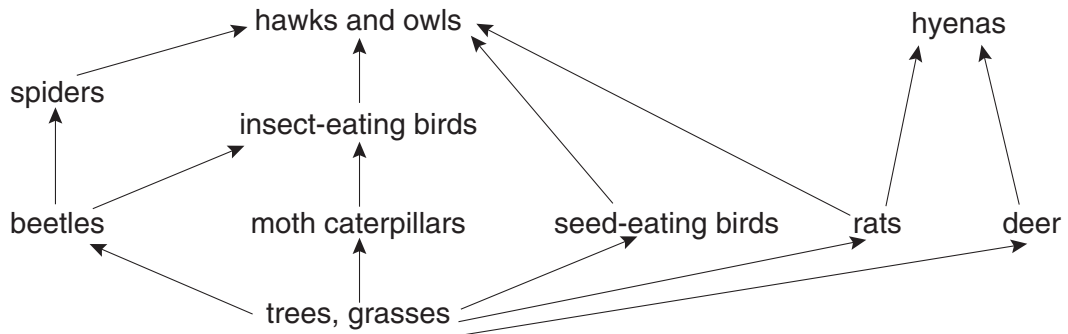


36 The diagram shows a section through the human eye.

Where will an image be formed when a person looks at an object?



37 The diagram shows part of a food web.



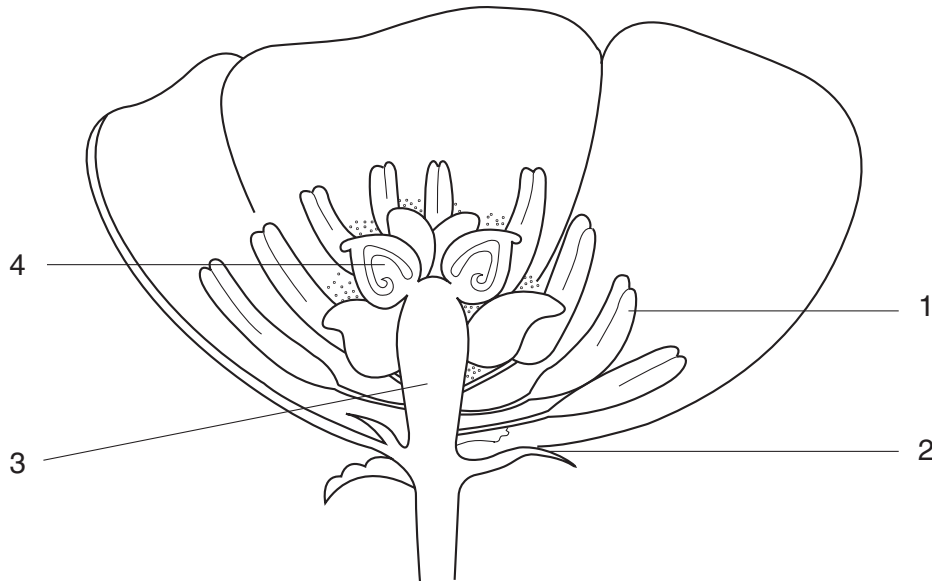
Which organisms are producers, herbivores and carnivores?

	producers	herbivores	carnivores
A	trees	moth caterpillars	deer
B	hawks	seed-eating birds	grasses
C	grasses	spiders	beetles
D	trees	beetles	spiders

38 Which air pollutant prevents some diffusion in the alveoli?

- A carbon dioxide
- B lead compounds
- C soot
- D sulphur dioxide

39 The diagram shows half a flower.



Where are the gametes produced?

- A 1 and 3
- B 1 and 4
- C 2 and 3
- D 2 and 4

40 Which of these diseases can be cured with antibiotics?

	gonorrhoea	HIV infection	syphilis
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
 ✓ = can be cured with antibiotics
 ✗ = cannot be cured with antibiotics

DATA SHEET
The Periodic Table of the Elements

		Group																					
I	II	III	IV	V	VI	VII	O																
7 Li Lithium 3	9 Be Beryllium 4	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>1 H Hydrogen 1</td> <td colspan="10"></td> </tr> </table>										1 H Hydrogen 1											4 He Helium 2
1 H Hydrogen 1																							
23 Na Sodium 11	24 Mg Magnesium 12	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18										
39 K Potassium 19	40 Ca Calcium 20	51 V Vanadium 23	48 Ti Titanium 22	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	84 Kr Krypton 36									
85 Rb Rubidium 37	88 Sr Strontium 38	93 Nb Niobium 41	91 Zr Zirconium 40	96 Mo Molybdenum 42	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	131 Xe Xenon 54									
133 Cs Caesium 55	137 Ba Barium 56	181 Ta Tantalum 73	178 Hf Hafnium 72	184 W Tungsten 74	190 Os Osmium 76	192 Ir Iridium 77	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	222 Rn Radon 86									
87 Fr Francium	88 Ra Radium	226 Ac Actinium											89 †										
		140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	144 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71								
		232 Th Thorium 90	232 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	244 Pu Plutonium 94	244 Am Americium 95	244 Cm Curium 96	247 Bk Berkelium 97	247 Cf Californium 98	251 Es Einsteinium 99	252 Fm Fermium 100	257 Md Mendelevium 101	258 No Nobelium 102	259 Lr Lawrencium 103								

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

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

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