

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.

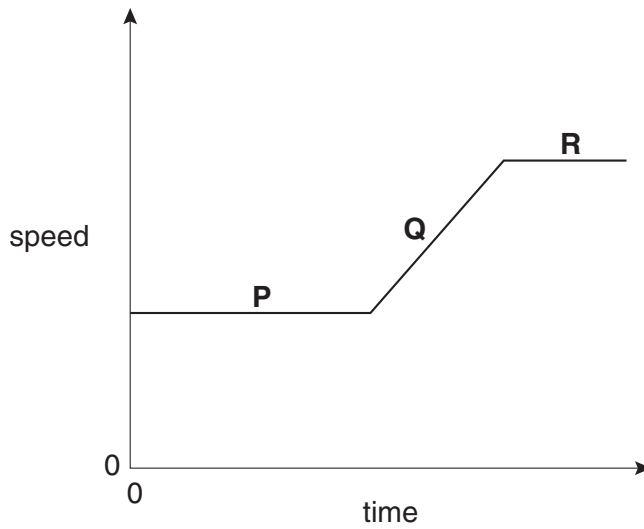
Any rough working should be done in this booklet.

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

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

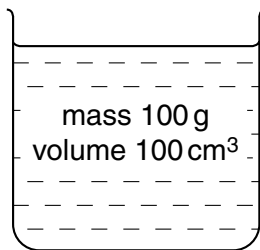


- 1 The graph shows how the speed of a car changes over a period of time.

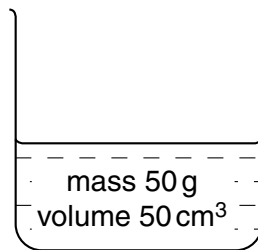


Which of the following is true?

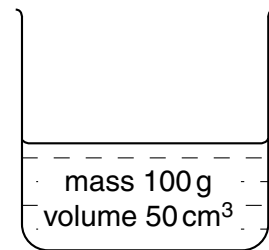
- A at **P** the car is at rest
  - B at **Q** the car has a non uniform acceleration
  - C at **Q** the car has uniform acceleration
  - D at **R** the car is accelerating
- 2 The beakers shown contain three different liquids



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?

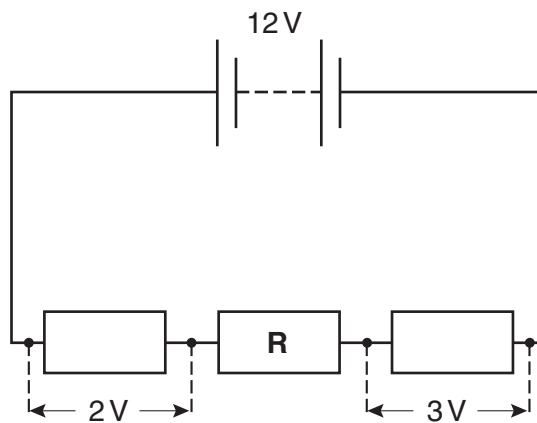
	type of wave	speed of wave in vacuo
<b>A</b>	longitudinal	340 m/s
<b>B</b>	longitudinal	$3 \times 10^8$ m/s
<b>C</b>	transverse	340 m/s
<b>D</b>	transverse	$3 \times 10^8$ m/s

- 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.

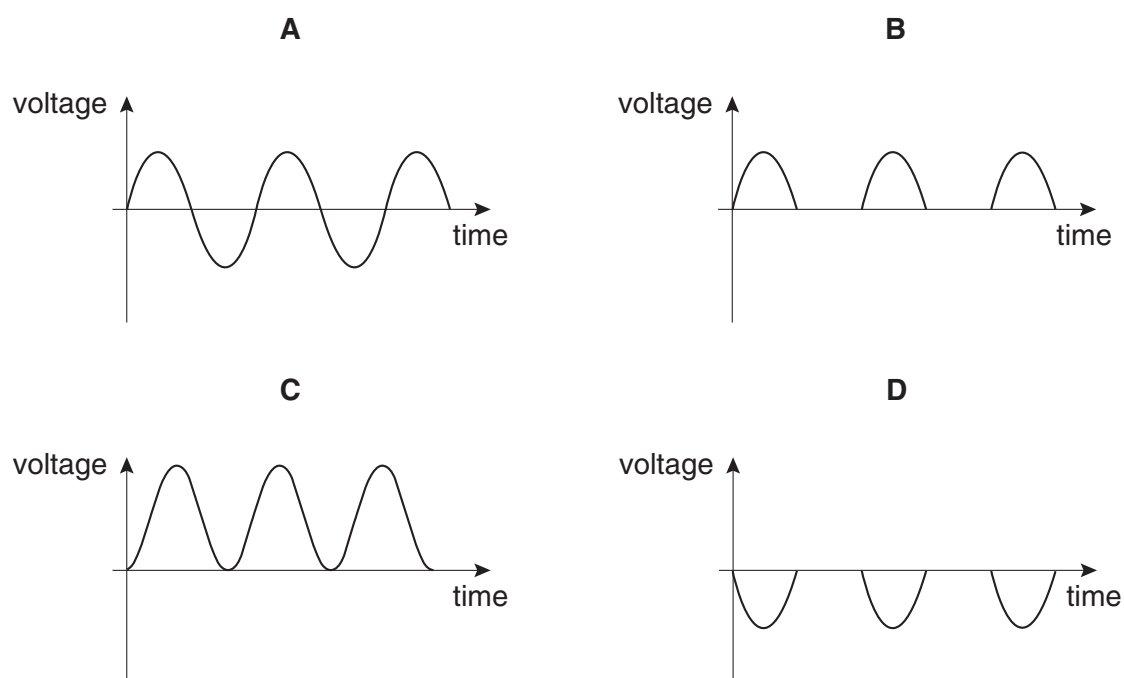


What is the p.d. across the third resistor, **R**?

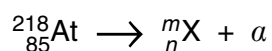
A 3.5 V                      B 5 V                      C 7 V                      D 10 V

- 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  $n$ ?

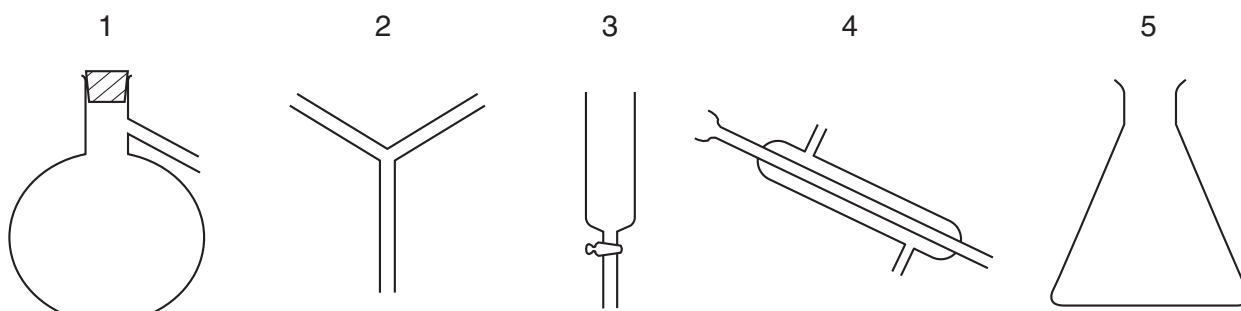
	$m$	$n$
<b>A</b>	214	83
<b>B</b>	218	84
<b>C</b>	218	86
<b>D</b>	222	87

- 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
<b>A</b>	16	18
<b>B</b>	16	34
<b>C</b>	18	16
<b>D</b>	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
<b>A</b>	13	14	14
<b>B</b>	13	13	14
<b>C</b>	13	14	27
<b>D</b>	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
<b>A</b>	5	2
<b>B</b>	5	12
<b>C</b>	6	1
<b>D</b>	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
<b>A</b>	low	soft
<b>B</b>	low	hard
<b>C</b>	high	soft
<b>D</b>	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?

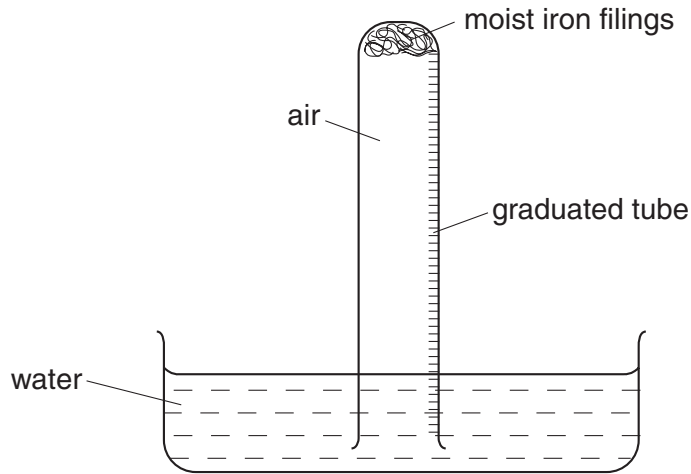
	most reactive $\rightarrow$ least reactive			
<b>A</b>	H	G	I	J
<b>B</b>	H	J	G	I
<b>C</b>	I	J	G	H
<b>D</b>	I	H	G	J

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

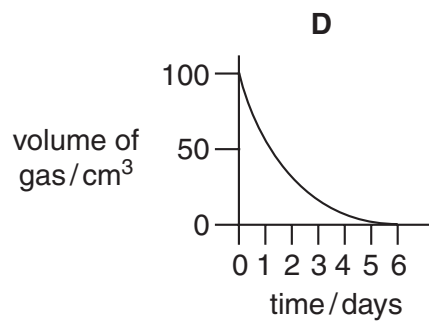
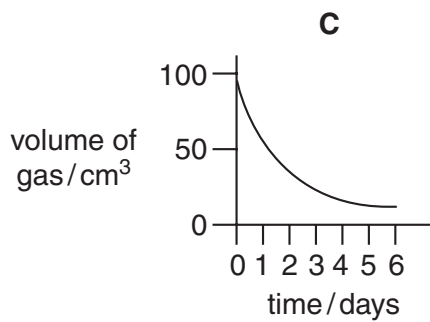
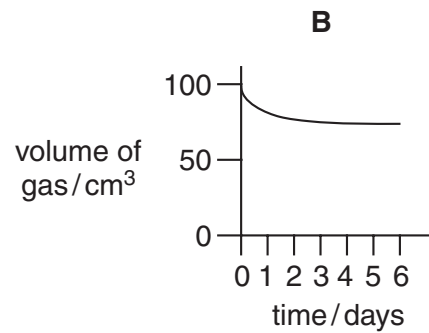
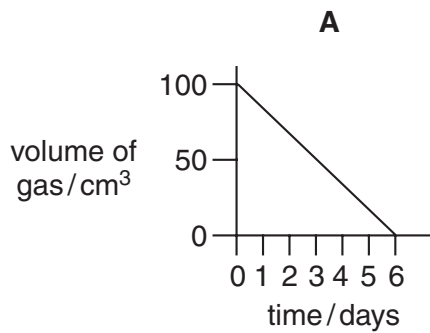
- A** Coke is used to oxidise the slag.
- B** Limestone is used to remove basic impurities.
- C** Molten iron floats on slag at the furnace base.
- D** The haematite is reduced by carbon monoxide.



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



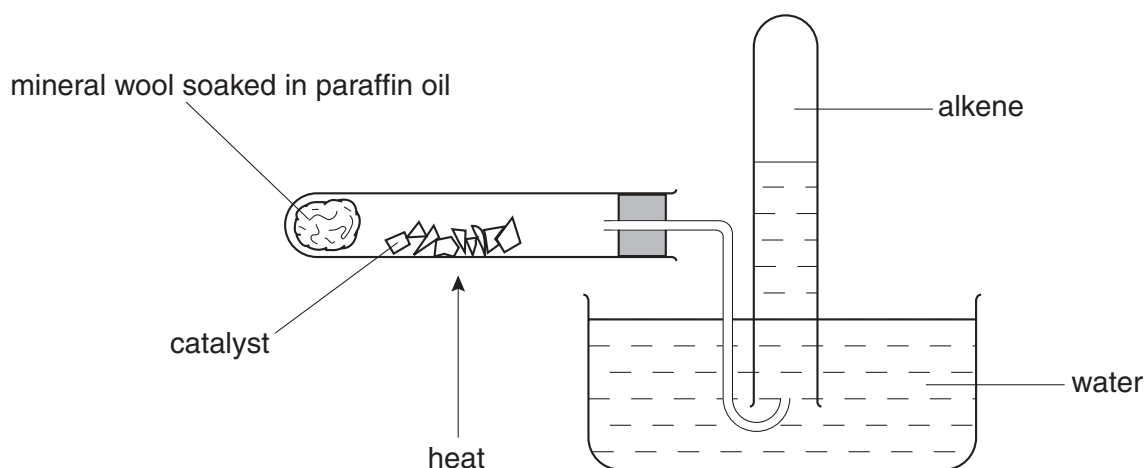
Which graph best represents how the volume of gas changes with time?



- 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.

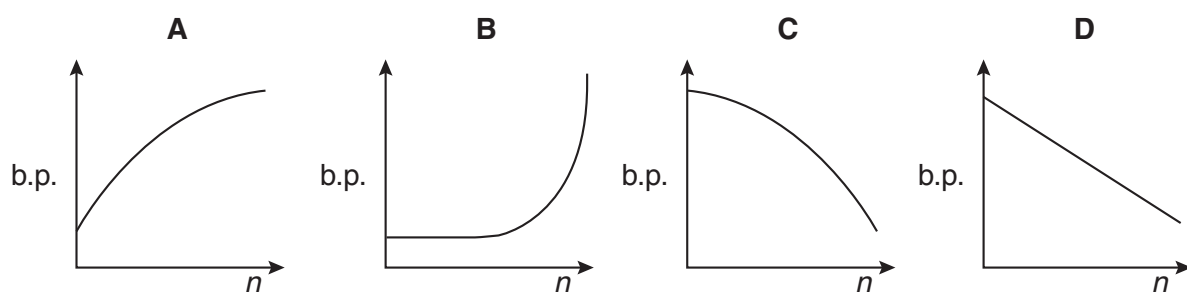


What type of reaction is taking place?

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

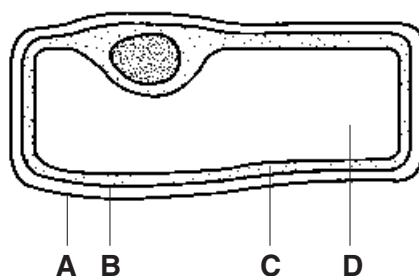
27 In the alkane series of hydrocarbons,  $C_nH_{2n+2}$ , the boiling point (b.p.) of the compound increases as  $n$  increases.

Which graph correctly represents this effect?

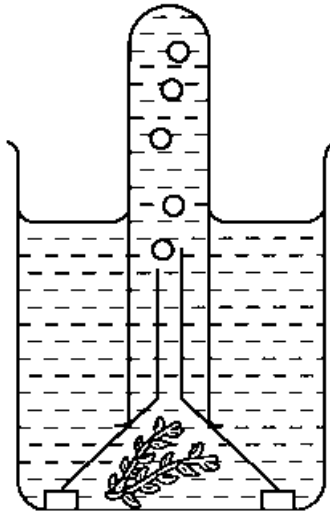


28 The diagram shows a cell from the epidermis of an onion.

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?

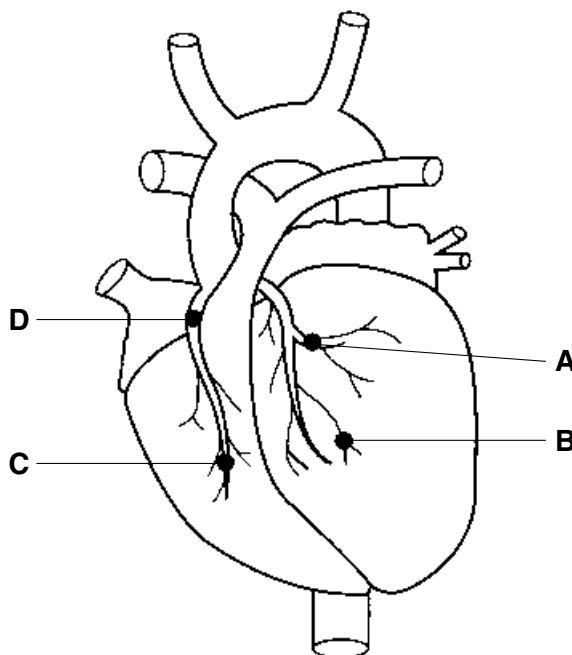
	light intensity	temperature / °C
<b>A</b>	high	5
<b>B</b>	low	5
<b>C</b>	high	25
<b>D</b>	low	25

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

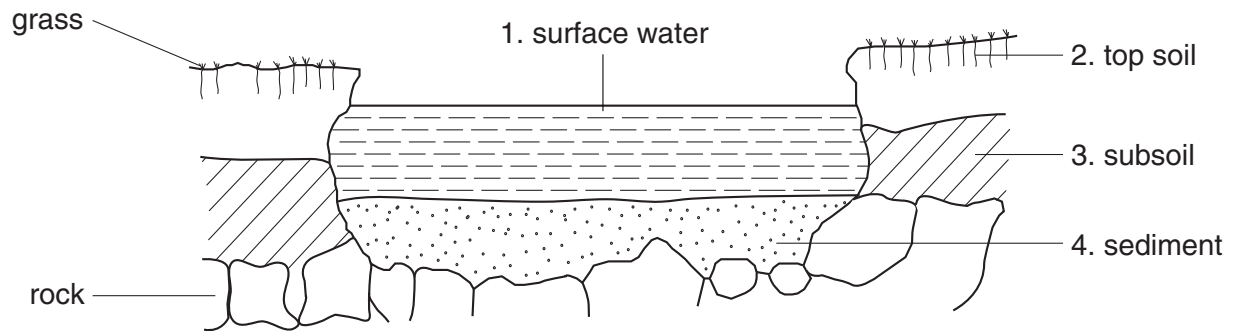
blood component	change in concentration
carbon dioxide	increased
glucose	increased
oxygen	reduced
urea	increased

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.

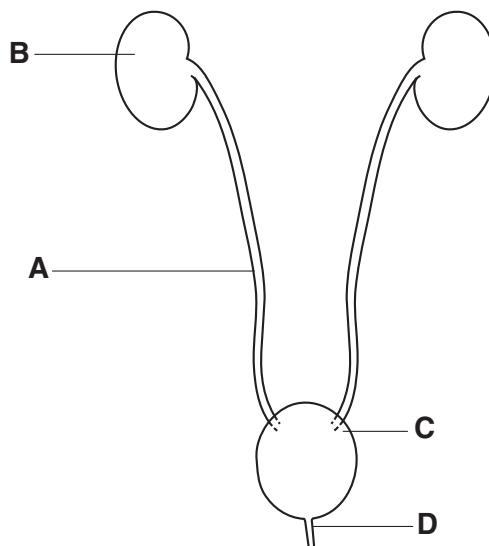


Where do microorganisms need to respire **anaerobically**?

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

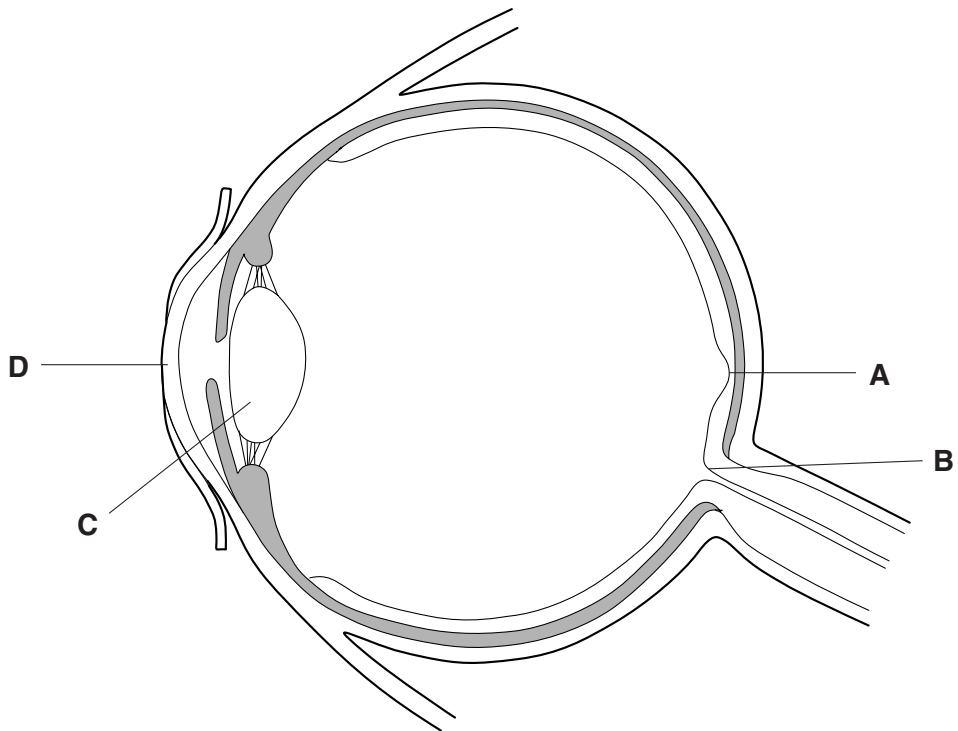
35 The diagram shows the urinary system.

Which part of this system removes urea from the blood?

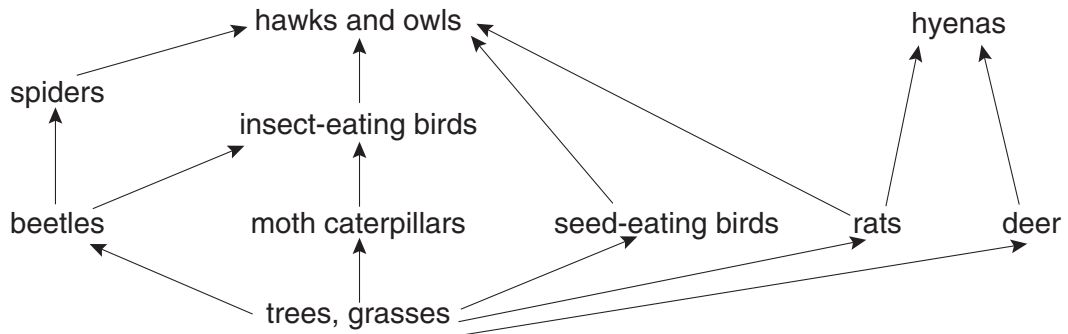


36 The diagram shows a section through the human eye.

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



37 The diagram shows part of a food web.



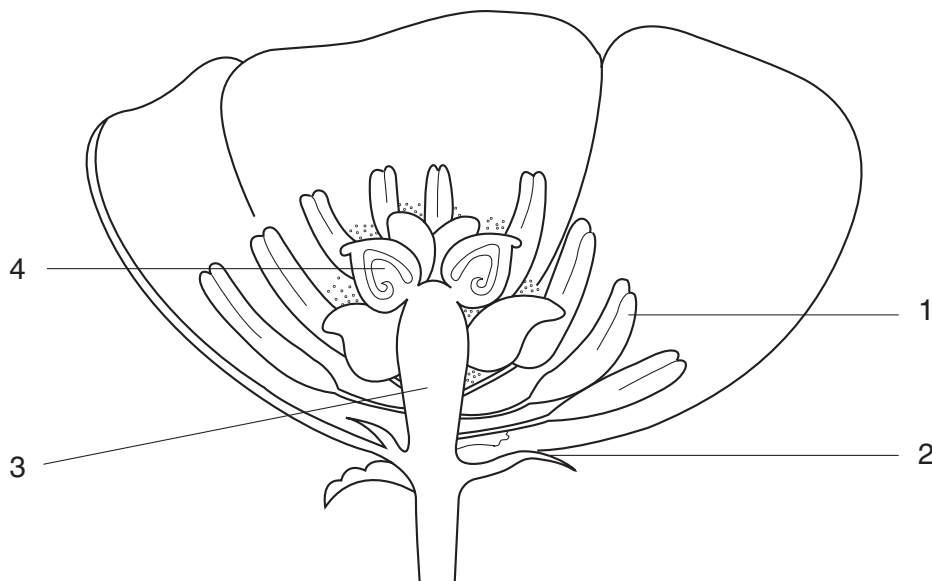
Which organisms are producers, herbivores and carnivores?

	producers	herbivores	carnivores
<b>A</b>	trees	moth caterpillars	deer
<b>B</b>	hawks	seed-eating birds	grasses
<b>C</b>	grasses	spiders	beetles
<b>D</b>	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 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4	11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	16 <b>O</b> Oxygen 8	19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10					4 <b>He</b> Helium 2			
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulphur 16	35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18								
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	84 <b>Kr</b> Krypton 36	
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	103 <b>Rh</b> Rhodium 45	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	131 <b>Xe</b> Xenon 54	
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178 <b>Hf</b> Hafnium 72	184 <b>W</b> Tungsten 74	190 <b>Os</b> Osmium 76	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	222 <b>Rn</b> Radon 86	
87 <b>Fr</b> Francium	88 <b>Ra</b> Radium	89 <b>Ac</b> Actinium													
		140 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	144 <b>Pm</b> Promethium 61	150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	159 <b>Tb</b> Terbium 65	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	167 <b>Er</b> Erbium 68	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71
		232 <b>Th</b> Thorium 90	232 <b>Pa</b> Protactinium 91	238 <b>U</b> Uranium 92	238 <b>Np</b> Neptunium 93	244 <b>Pu</b> Plutonium 94	244 <b>Am</b> Americium 95	244 <b>Cm</b> Curium 96	247 <b>Bk</b> Berkelium 97	247 <b>Cf</b> Californium 98	251 <b>Es</b> Einsteinium 99	252 <b>Fm</b> Fermium 100	257 <b>Md</b> Mendelevium 101	258 <b>No</b> Nobelium 102	259 <b>Lr</b> Lawrencium 103

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

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

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).