

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.

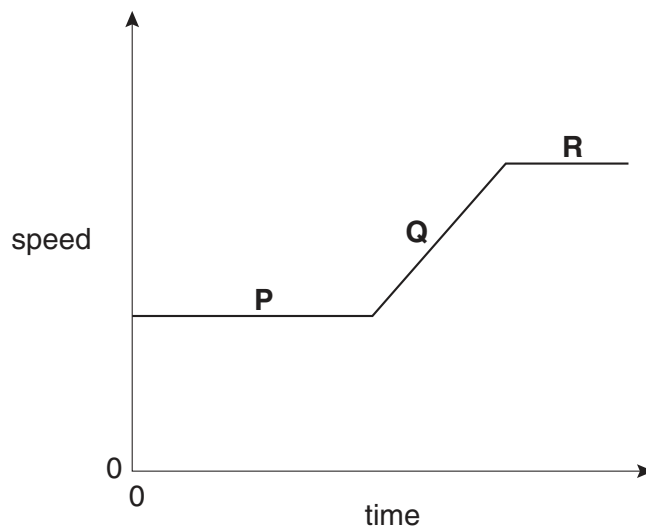
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

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

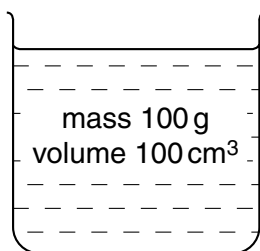
This document consists of **16** printed pages.

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

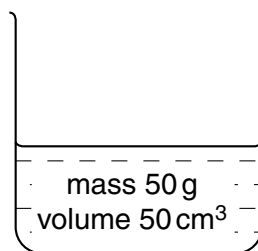


Which of the following is true?

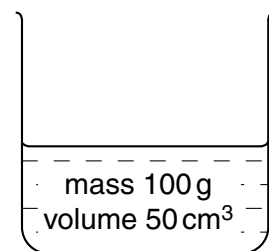
- A at **P** the car is at rest
 - B at **Q** the car has a non uniform acceleration
 - C at **Q** the car has uniform acceleration
 - D at **R** the car is accelerating
- 2 The beakers shown contain three different liquids



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?

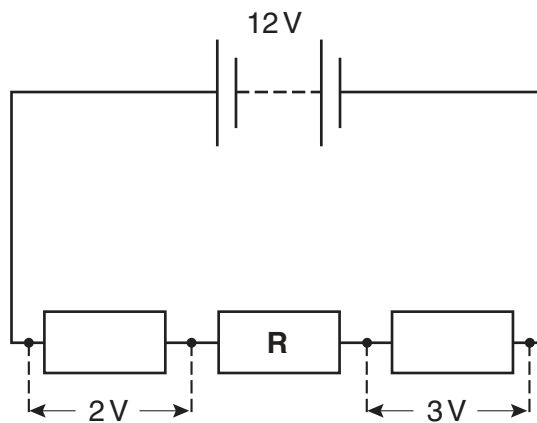
| | type of wave | speed of wave in vacuo |
|----------|--------------|------------------------|
| A | longitudinal | 340 m/s |
| B | longitudinal | 3×10^8 m/s |
| C | transverse | 340 m/s |
| D | transverse | 3×10^8 m/s |

- 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.

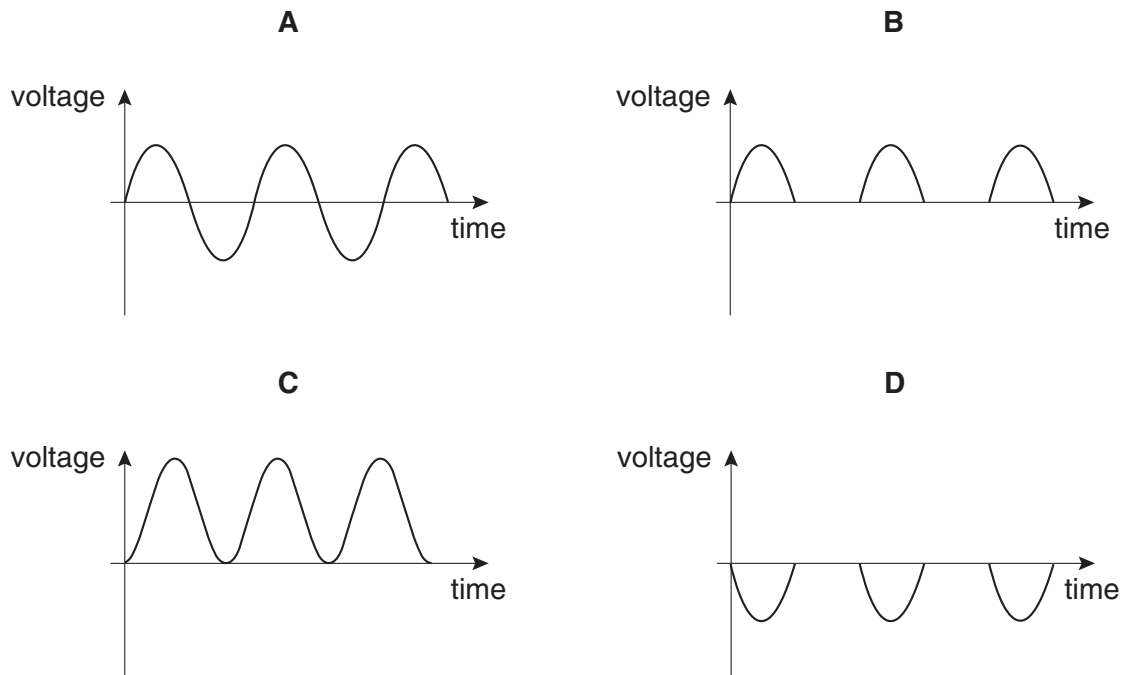


What is the p.d. across the third resistor, **R**?

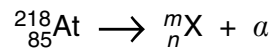
A 3.5 V B 5 V C 7 V D 10 V

- 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 ?

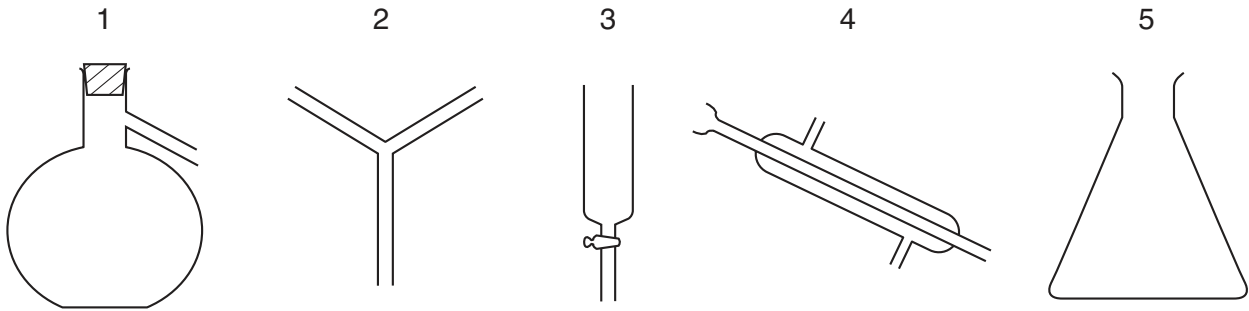
| | m | n |
|----------|-----|-----|
| A | 214 | 83 |
| B | 218 | 84 |
| C | 218 | 86 |
| D | 222 | 87 |

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 |

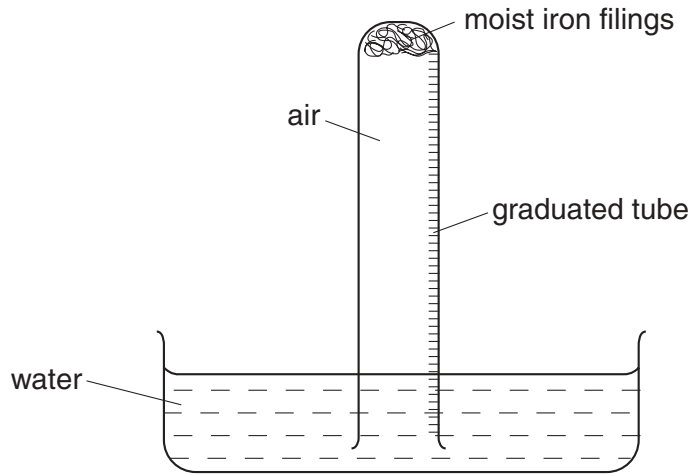
What is the order of reactivity of these metals?

| | most reactive | → | | least reactive |
|----------|---------------|---|---|----------------|
| A | H | G | I | J |
| B | H | J | G | I |
| C | I | J | G | H |
| D | I | H | G | J |

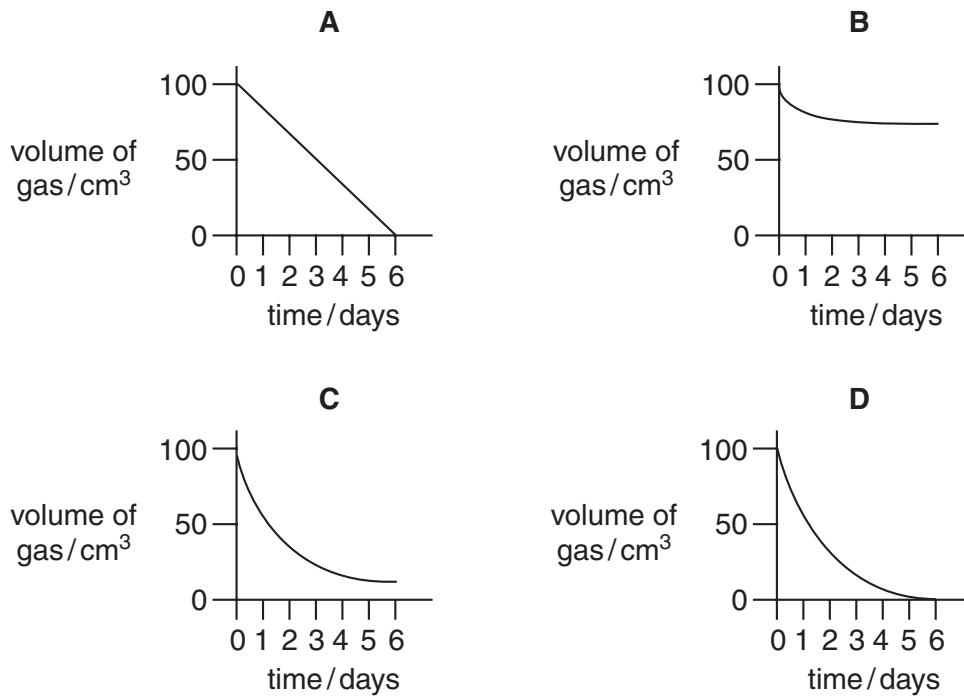
23 Which statement about the production of iron from haematite is correct?

- 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.



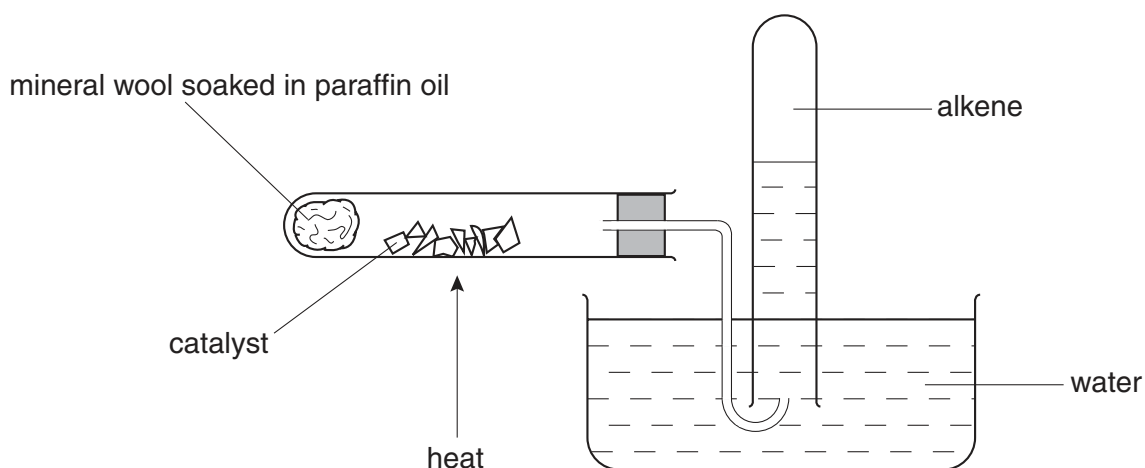
Which graph best represents how the volume of gas changes with time?



- 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.

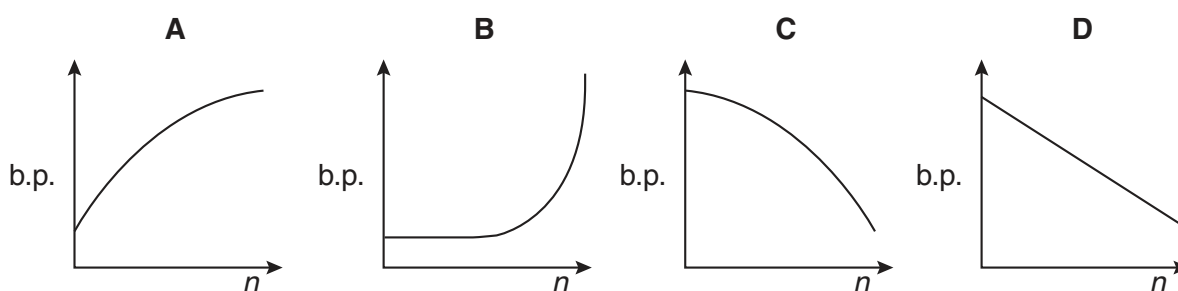


What type of reaction is taking place?

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

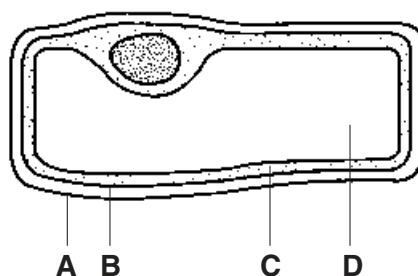
27 In the alkane series of hydrocarbons, C_nH_{2n+2} , the boiling point (b.p.) of the compound increases as n increases.

Which graph correctly represents this effect?

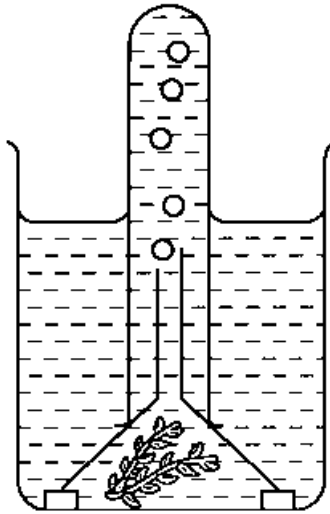


28 The diagram shows a cell from the epidermis of an onion.

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?

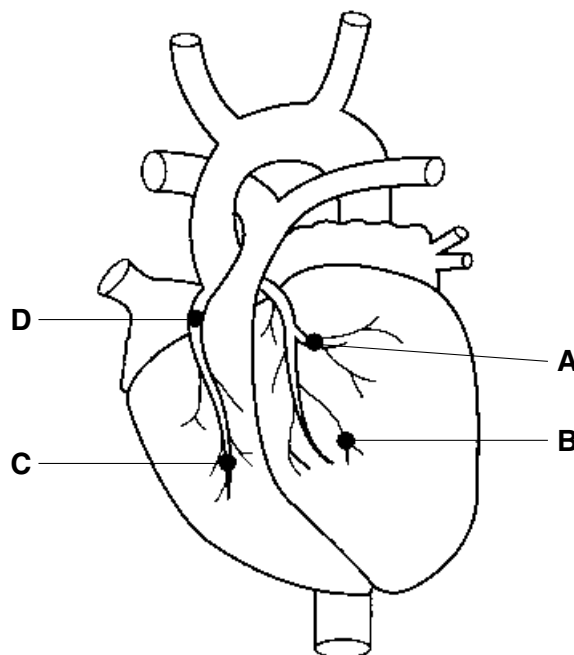
| | light intensity | temperature / °C |
|----------|-----------------|------------------|
| A | high | 5 |
| B | low | 5 |
| C | high | 25 |
| D | low | 25 |

- 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 |

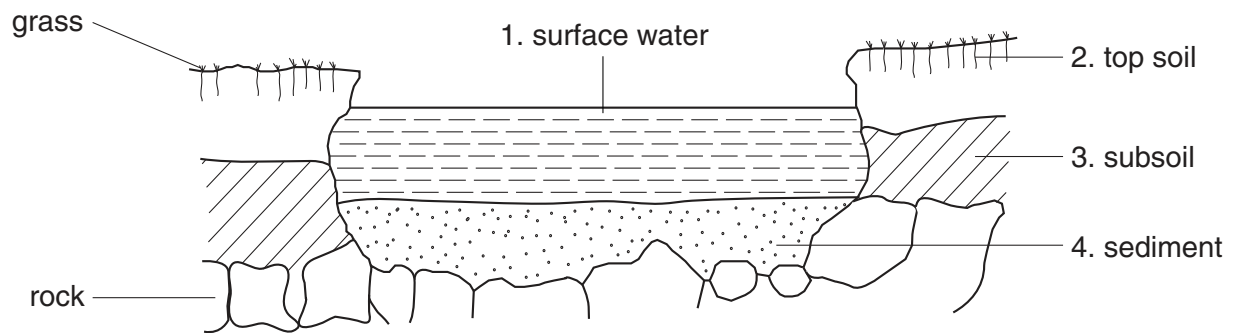
Which organ has the blood passed through?

- 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?



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

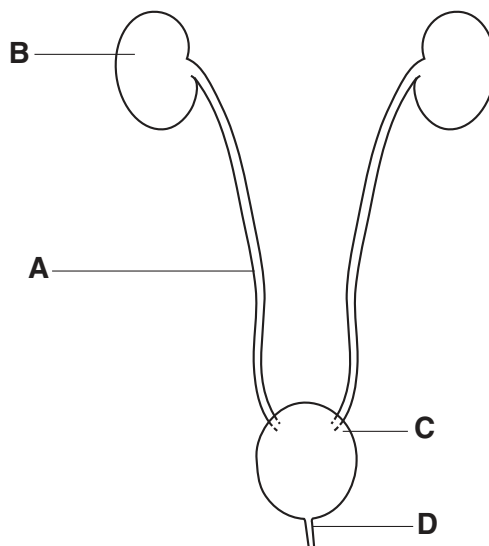


Where do microorganisms need to respire **anaerobically**?

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

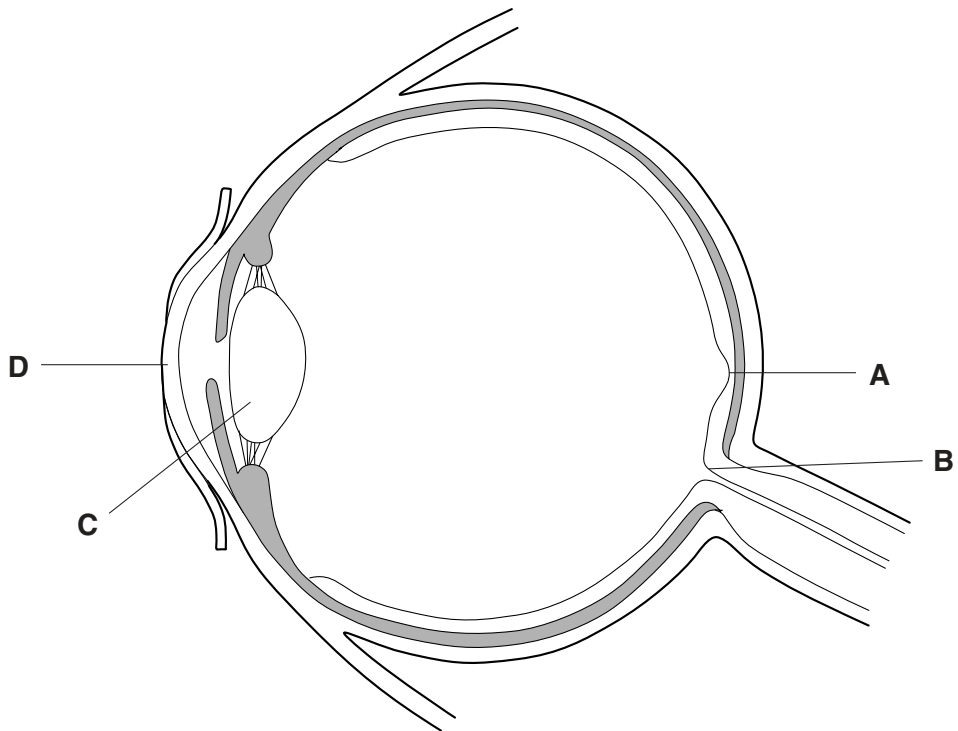
35 The diagram shows the urinary system.

Which part of this system removes urea from the blood?

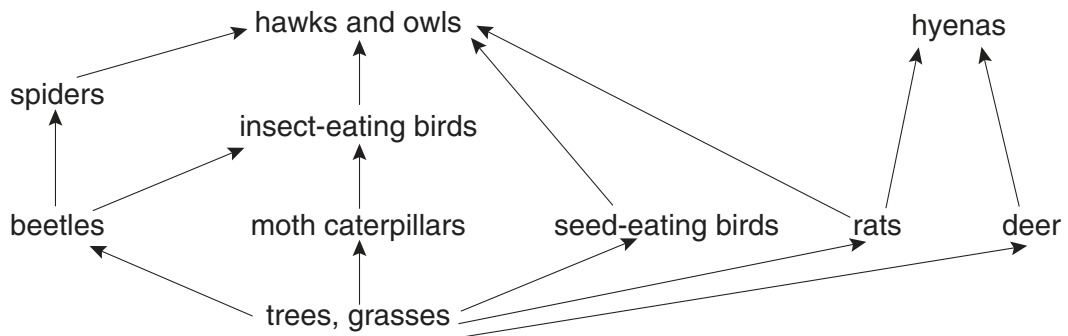


36 The diagram shows a section through the human eye.

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



37 The diagram shows part of a food web.



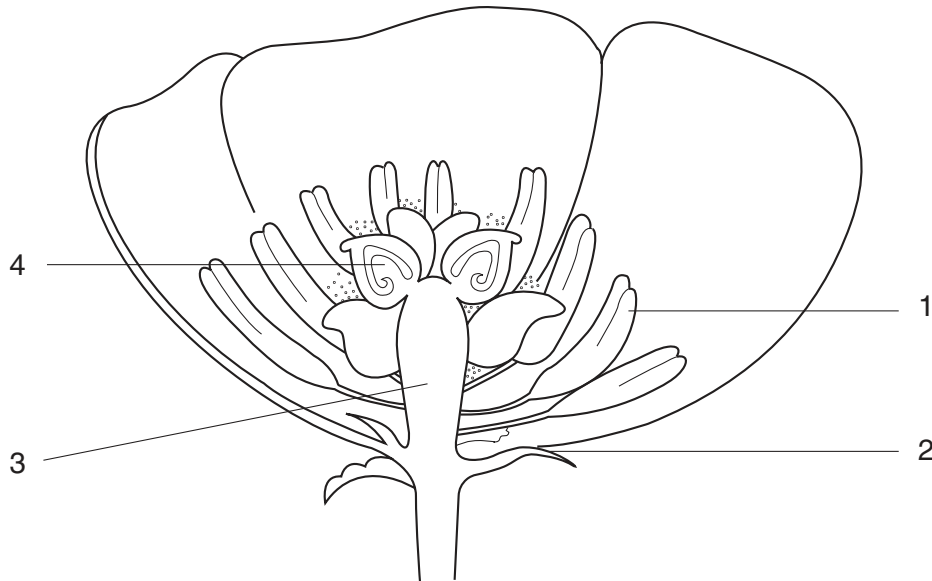
Which organisms are producers, herbivores and carnivores?

| | 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 | 1 H Hydrogen 1 | | | | | | | | | | 4 He Helium 2 | | | |
| 23 Na Sodium 11 | 24 Mg Magnesium 12 | | | | | | | | | | | 11 B Boron 5 | 12 C Carbon 6 | 14 N Nitrogen 7 | 16 O Oxygen 8 |
| 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 | 227 Ac Actinium | | | | | | | | | | | | | |
| | | 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 | 238 Pu Plutonium 94 | 238 Am Americium 95 | 238 Cm Curium 96 | 238 Bk Berkelium 97 | 238 Cf Californium 98 | 238 Es Einsteinium 99 | 238 Fm Fermium 100 | 238 Md Mendelevium 101 | 238 No Nobelium 102 | 238 Lr Lawrencium 103 |

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

| | |
|--------------------------|----------------------------|
| a | X |
| a = relative atomic mass | X = atomic symbol |
| b | b = proton (atomic) number |

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