UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE **5129/01**

Paper 1 Multiple Choice

May/June 2006

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.

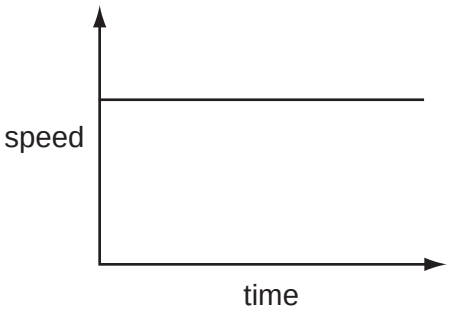
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 16.

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

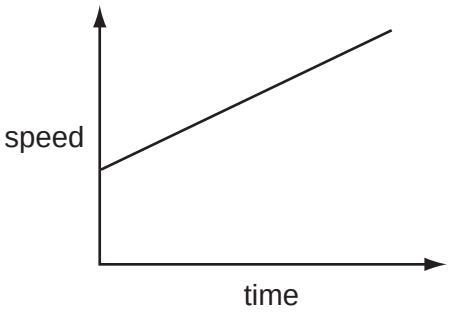
1 A constant force causes a car to accelerate.

Which graph shows how the speed of the car varies with time?

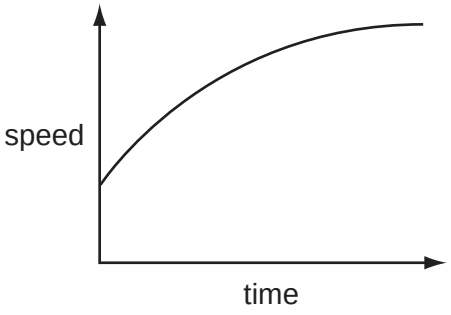
A



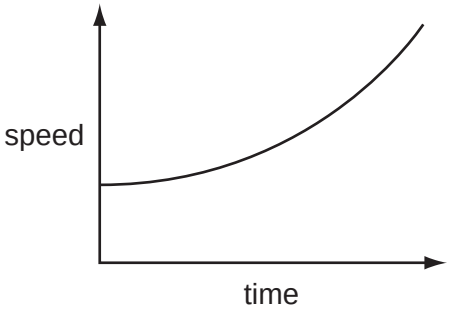
B



C

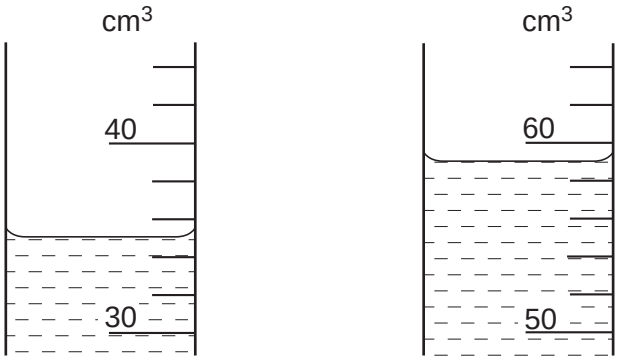


D



2 A quantity of water is poured into a measuring cylinder. A small piece of rock is then added carefully.

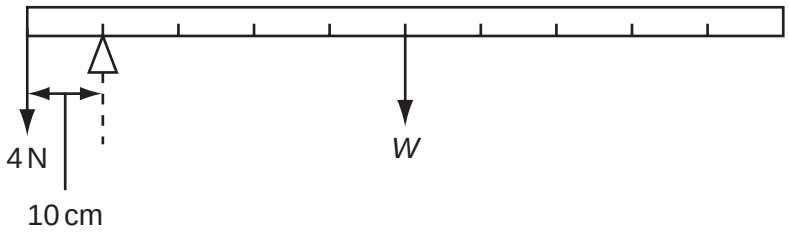
The two diagrams show the water levels and the measuring cylinder scales.



What are the correct values for the volumes of water and rock?

	volume of water / cm^3	volume of rock / cm^3
A	32.5	22.0
B	32.5	54.5
C	35.0	24.0
D	35.0	59.0

3 A uniform metre rule is balanced by a 4 N weight as shown in the diagram.



What is the weight *W* of the metre rule?

A 1 N **B** 4 N **C** 16 N **D** 40 N

4 Which property of a body **cannot** be changed if a force is applied to it?

A its mass

B its shape

C its size

D its velocity

5 What are the energy changes in hydroelectric power production?

A kinetic → electrical → potential

B kinetic → potential → electrical

C potential → electrical → kinetic

D potential → kinetic → electrical

6 The earliest Ford cars were always painted black. This was because black paint dried more quickly than lighter colours when the cars were left in the sun to dry.

Which property of black paint makes it dry more quickly?

A It is the best absorber of heat.

B It is the best conductor of heat.

C It is the best insulator of heat.

D It is the best reflector of heat.

7 Water waves are produced in a ripple tank using a vibrator of frequency 3 Hz.

Which values of speed and wavelength could the waves have?

	speed / cm per s	wavelength / cm
A	1	3
B	5	15
C	6	2
D	12	6

8 When a converging lens is used as a magnifying glass, what is the nature of the image?

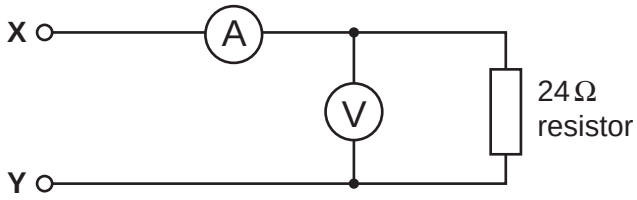
A real and inverted

B real and upright

C virtual and inverted

D virtual and upright

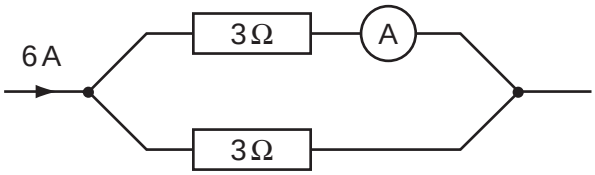
9 The diagram shows an electric circuit.



Which pair of readings is obtained when a suitable power supply is connected to **X** and **Y**?

	voltmeter	ammeter
A	2 V	6 A
B	2 V	0.5 A
C	12 V	0.5 A
D	12 V	2 A

10 A current of 6 A flows in the circuit shown. The current splits up when it enters parallel branches of resistors.



What is the reading on the ammeter?

A 2 A **B** 3 A **C** 6 A **D** 12 A

11 Which properties make materials suitable for use as a core in an electromagnet?

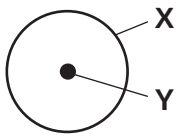
A difficult to magnetise and easy to demagnetise

B difficult to magnetise and retains magnetic strength

C easy to magnetise and demagnetise

D easy to magnetise and retains magnetic strength

12 In the simple model of an atom, **X** orbits around **Y**.



What are **X** and **Y**?

	X	**Y**
A	electron	nucleus
B	neutron	electron
C	nucleus	proton
D	proton	neutron

13 **X**, **Y** and **Z** are three types of radiation.

X is almost completely absorbed by 5 cm lead but not by 5 mm aluminium.

Y is almost completely absorbed by 5 mm aluminium but not by thin card.

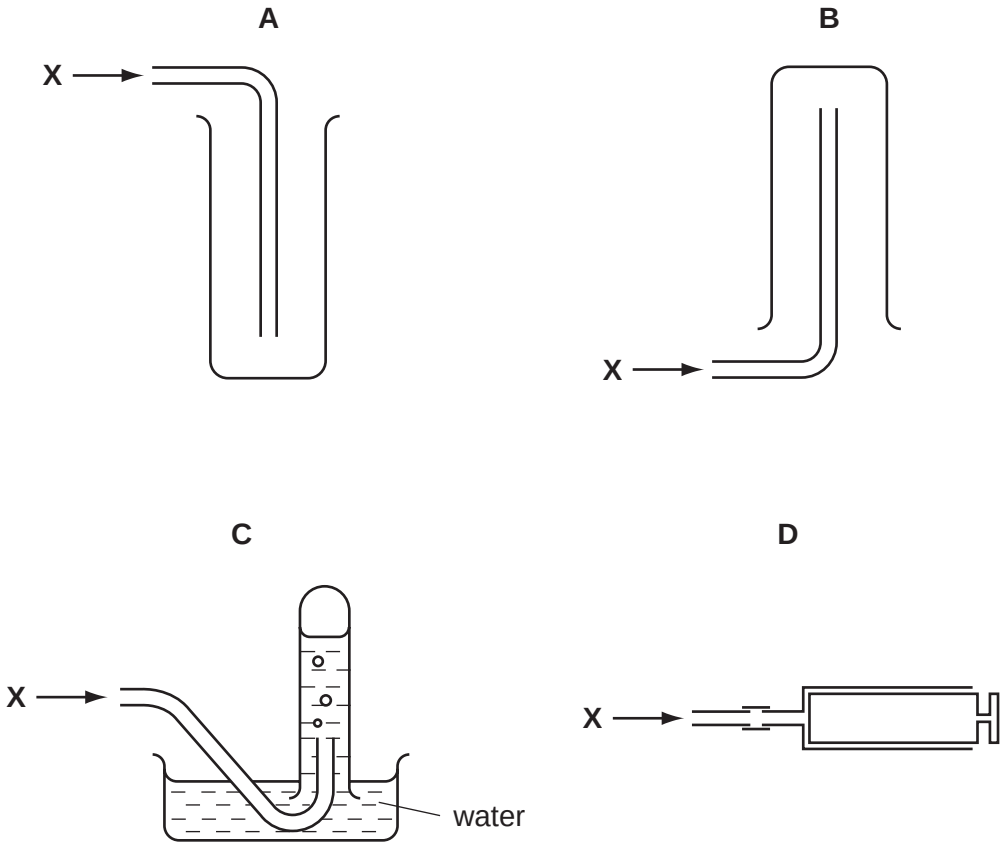
Z is absorbed by thin card.

What are **X**, **Y** and **Z**?

	X	Y	Z
A	alpha	beta	gamma
B	beta	alpha	gamma
C	gamma	alpha	beta
D	gamma	beta	alpha

14 A gas, **X**, is less dense than air and insoluble in water.

Which method **cannot** be used to collect the gas?



15 Which particle contains 10 electrons and 12 neutrons?

A $^{19}_{9}F^{-}$

B $^{24}_{12}Mg$

C $^{23}_{11}Na^{+}$

D $^{21}_{10}Ne$

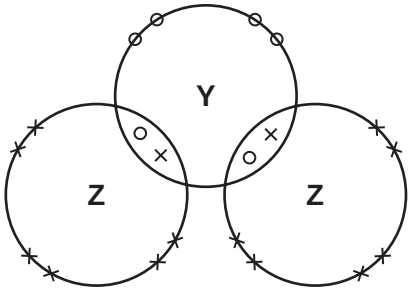
16 Each atom of element Q contains 2 electrons in its outermost shell.

Each atom of element J contains 7 electrons in its outermost shell.

What is the formula of the compound formed when Q and J combine?

A QJ **B** QJ_2 **C** Q_2J **D** Q_2J_7

17 The diagram shows the outer shell electrons in the compound $\mathbf{YZ_2}$.



key

○ electrons of **Y** atom

× electrons of **Z** atom

Which pair of elements could be **Y** and **Z**?

	Y	Z
A	calcium	fluorine
B	carbon	sulphur
C	oxygen	hydrogen
D	sulphur	chlorine

18 Copper(II) sulphate crystals lose water when heated.

	$CuSO_4.5H_2O$	→	$CuSO_4$	+	$5H_2O$
M_r	250		160		

What is the mass of water lost on heating 5 g of $CuSO_4.5H_2O$?

A 4.5 g **B** 1.8 g **C** 0.9 g **D** 0.18 g

19 Strontium hydroxide is an alkali.

Which statement about aqueous strontium hydroxide is correct?

A The solution contains fewer hydrogen ions than hydroxide ions.

B The solution has a pH less than 7.

C The solution reacts with metal carbonates to form carbon dioxide.

D The solution turns blue litmus red.

20 The names and electronic structures of the noble gases are shown.

helium	2
neon	2, 8
argon	2, 8, 8
krypton	2, 8, 18, 8
xenon	2, 8, 18, 18, 8

Why are the noble gases unreactive?

A They all have an even number of electrons.

B They all have a stable arrangement of electrons.

C They all have eight electrons in the outer shell.

D They all have two electrons in the first shell.

21 An excess of zinc powder is added to a solution containing a mixture of the ions Ca^{2+}, Cu^{2+}, Fe^{2+} and Mg^{2+}.

Which two metals are displaced from this solution?

A calcium and copper

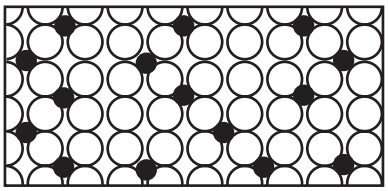
B calcium and magnesium

C copper and iron

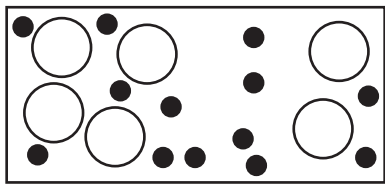
D magnesium and iron

22 Which drawing shows the arrangement of particles in a solid alloy?

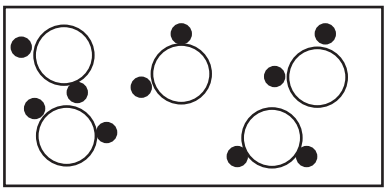
A



B



C



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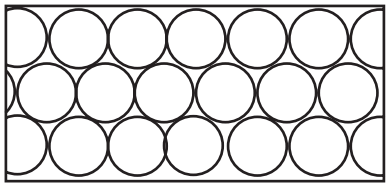
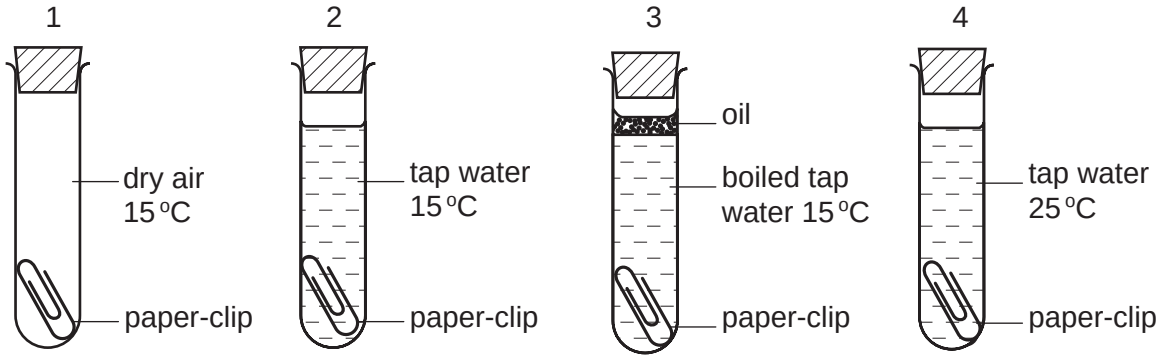


23 Four experiments on rusting are shown.



Which two experiments show that air is needed for iron to rust?

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

24 Which conditions are used for the manufacture of ammonia by the Haber process?

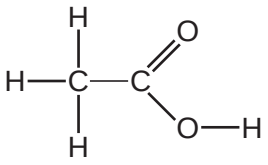
	catalyst used	pressure / atm	temperature / °C
A	iron	200	450
B	iron	450	200
C	nickel	200	450
D	nickel	450	200

25 Which compound is an alkene?

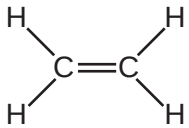
A CH_4 **B** C_2H_6 **C** C_3H_8 **D** C_4H_8

26 The structures of four organic compounds are shown.

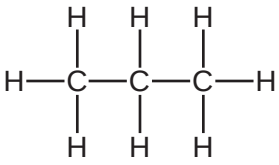
1



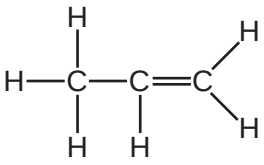
2



3



4



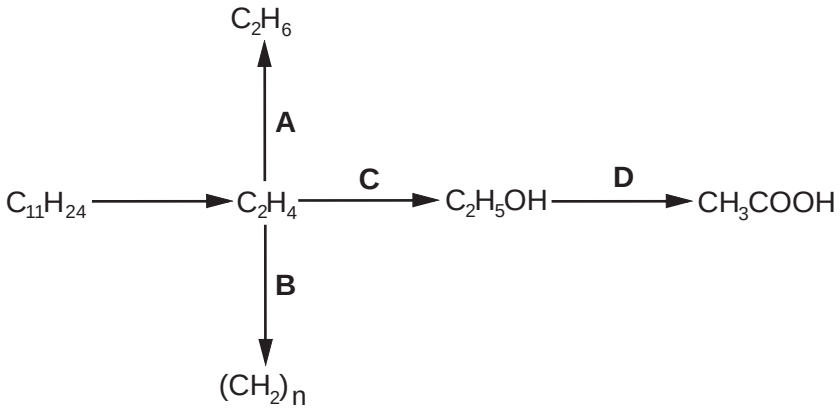
Which compounds decolourise aqueous bromine?

A 1 and 2 only **B** 2 and 4 only **C** 3 only **D** 3 and 4 only

27 The hydrocarbon $C_{11}H_{24}$ is present in crude oil.

The diagram shows reactions by which various products can be obtained from $C_{11}H_{24}$.

In which step does oxidation take place?



28 A cell is being examined.

Which feature would enable you to identify it as a plant cell or an animal cell?

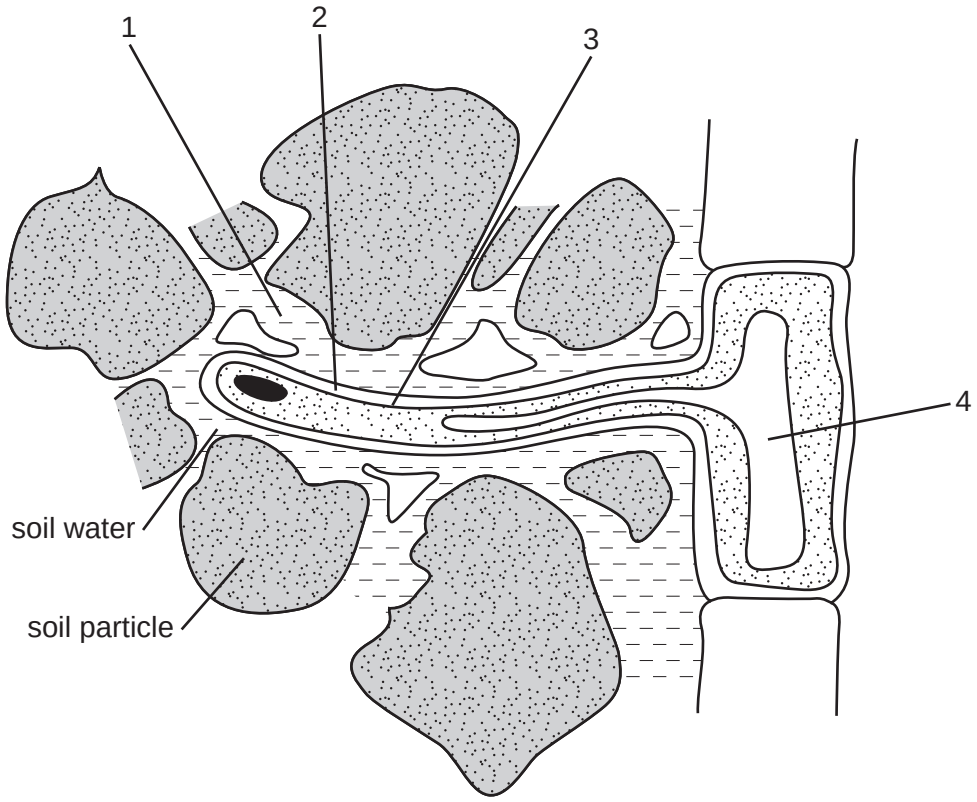
A The cell contains a single large sap vacuole space.

B The cell contains glucose and amino acids.

C The cell contains stored fat.

D The cell surface membrane is partially permeable.

29 The diagram shows a root hair cell and surrounding soil particles.



Osmosis occurs when regions of higher and lower concentration of water molecules are separated by a partially permeable membrane.

On the diagram, what are these regions?

	higher concentration of water molecules	partially permeable membrane	lower concentration of water molecules
A	1	2	4
B	1	3	4
C	4	2	1
D	4	3	1

30 What are enzymes?

A fats which are secreted by glands in the digestive system

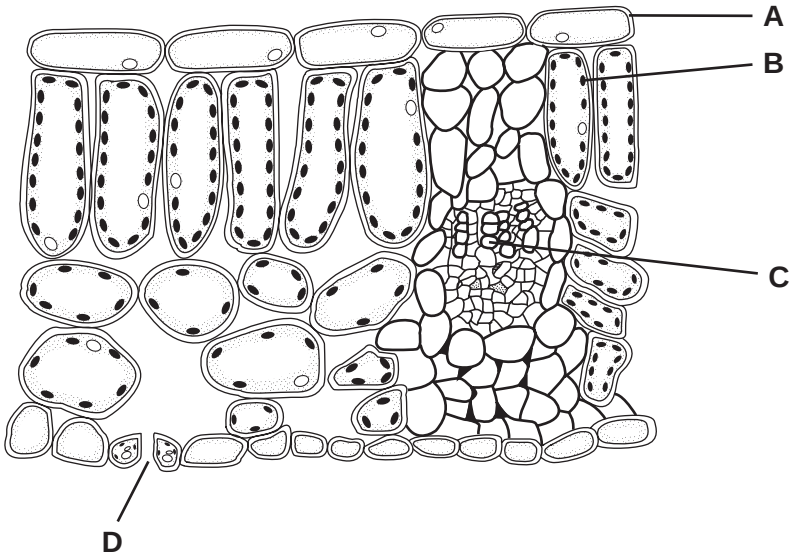
B proteins which are unaffected by temperature

C fats which have a characteristic molecular shape

D proteins which act as biological catalysts

31 The diagram shows a cross section of a leaf under the microscope.

Where is light energy converted into chemical energy?



32 After eating, the pH in the mouth decreases.

Which statement explains this decrease?

A Bacteria release acids.

B Enzymes in saliva release acids.

C Salivary glands release acids.

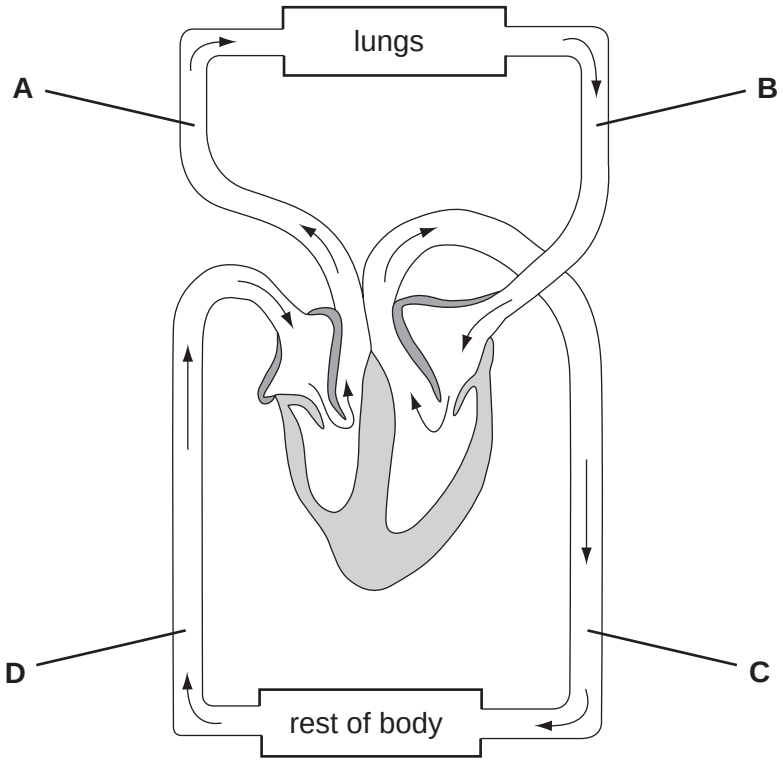
D Taste receptors release acids.

33 What causes wilting to occur in a plant?

	water loss	water uptake
A	high	high
B	high	low
C	low	high
D	low	low

34 The diagram shows the circulatory system.

In which vessel is the blood pressure highest?



35 What are the products of anaerobic respiration in yeast?

A alcohol and carbon dioxide

B carbon dioxide and glucose

C glucose and oxygen

D oxygen and alcohol

36 Which **cannot** be an example of excretion?

A Carbon dioxide is breathed out from the lungs.

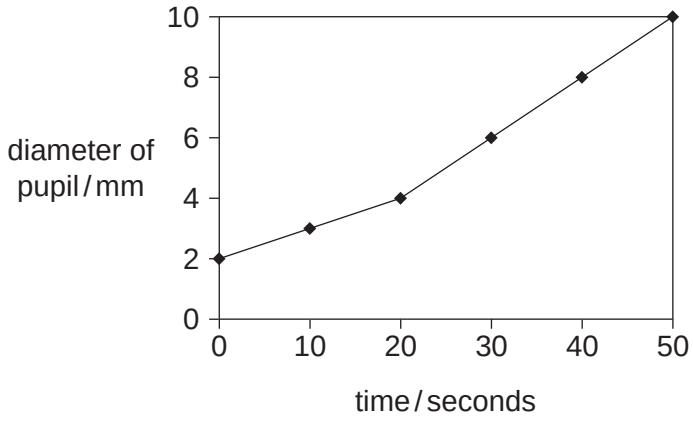
B Undigested food leaves the body through the anus.

C Urea leaves the body in urine.

D Water is removed through the kidneys.

37 A light of varying intensity was shone into a person's eye for 50 seconds.

The graph shows changes in pupil size as the light intensity was changed.



Which statement explains the change in pupil size?

A The light slowly became brighter.

B The light suddenly became brighter.

C The light slowly became dimmer.

D The light suddenly became dimmer.

38 What are the effects of the excessive consumption of alcohol?

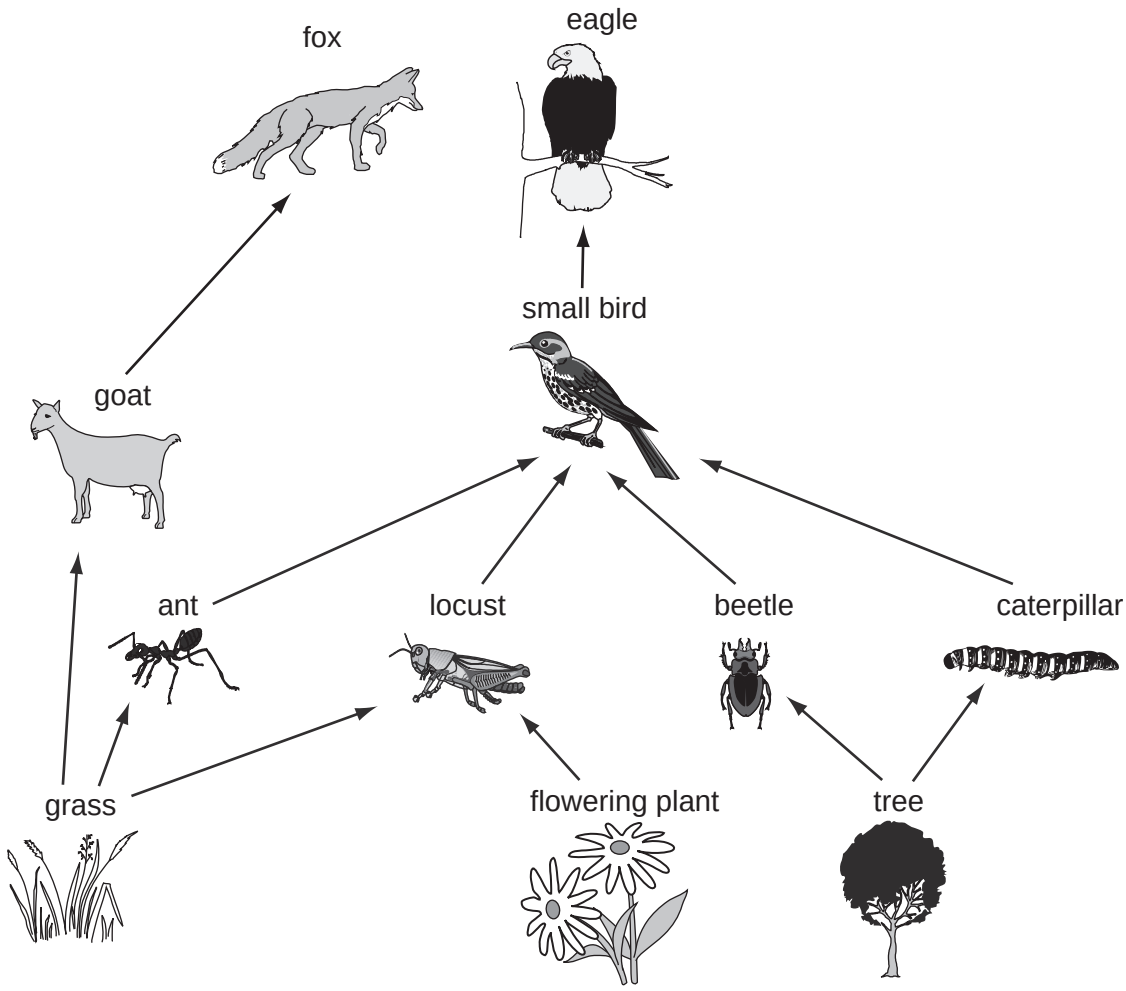
	depressant	liver damage	quicker reaction time
A	✓	✗	✓
B	✓	✓	✗
C	✗	✗	✓
D	✗	✓	✗

key

✓ = effect occurs

✗ = effect does not occur

39 The diagram shows part of a food web.



How many herbivores are shown?

A 3 **B** 4 **C** 5 **D** 6

40 Which structures protect the flower when it is a bud?

A anthers

B carpels

C petals

D sepals

DATA SHEET
The Periodic Table of the Elements

Group																	
I	II									III	IV	V	VI	VII	0
															4 He Helium 2
					1 H Hydrogen 1										
7 Li Lithium 3	9 Be Beryllium 4									11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12									27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphonus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	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	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	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	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	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	Po Polonium 84	At Astatine 85	Rn Radon 86
226 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr 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^3 at room temperature and pressure (r.t.p.).