

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.

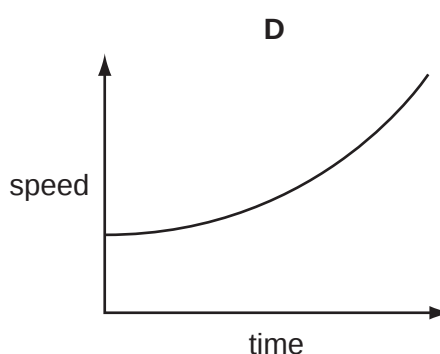
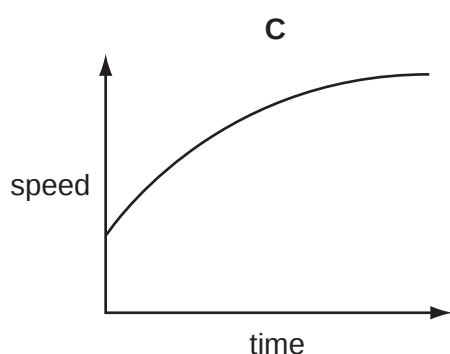
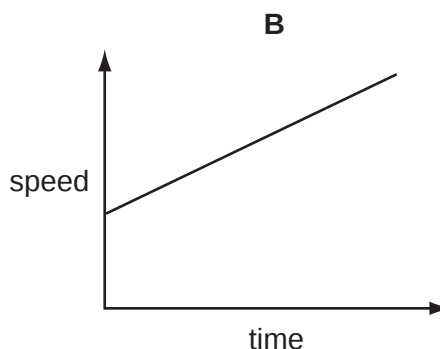
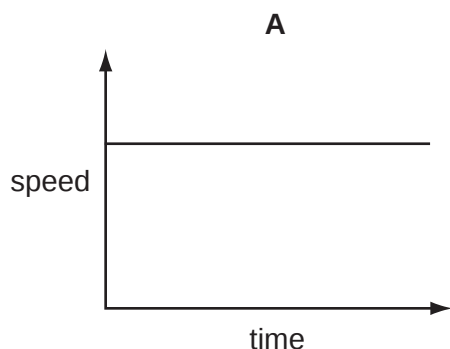
A copy of the Periodic Table is printed on page 16.

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

2

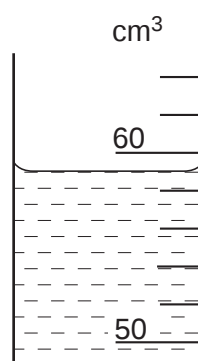
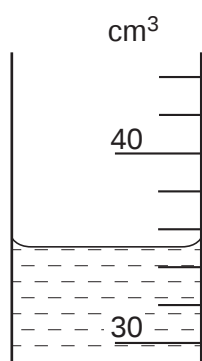
- 1 A constant force causes a car to accelerate.

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



- 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.

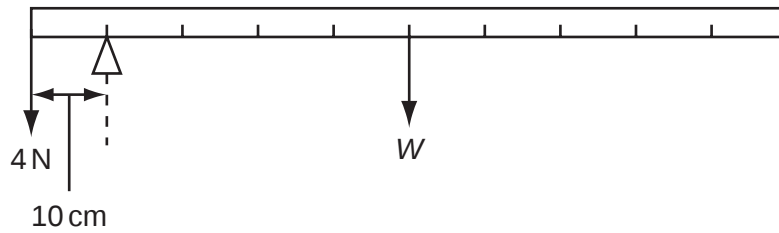


What are the correct values for the volumes of water and rock?

	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

- 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 $\rightarrow$ electrical $\rightarrow$ potential
B kinetic $\rightarrow$ potential $\rightarrow$ electrical
C potential $\rightarrow$ electrical $\rightarrow$ kinetic
D potential $\rightarrow$ kinetic $\rightarrow$ 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.

4

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

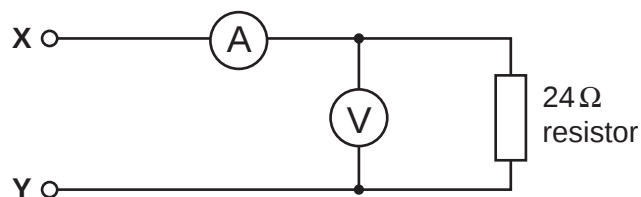
Which values of speed and wavelength could the waves have?

	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

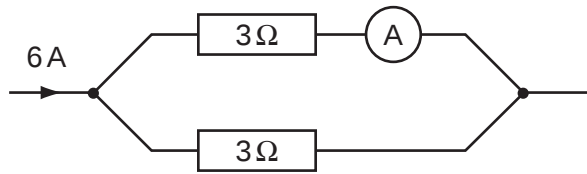
- 9 The diagram shows an electric circuit.



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

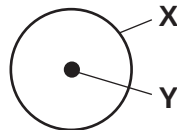
	voltmeter	ammeter
A	2 V	6 A
B	2 V	0.5 A
C	12 V	0.5 A
D	12 V	2 A

- 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.

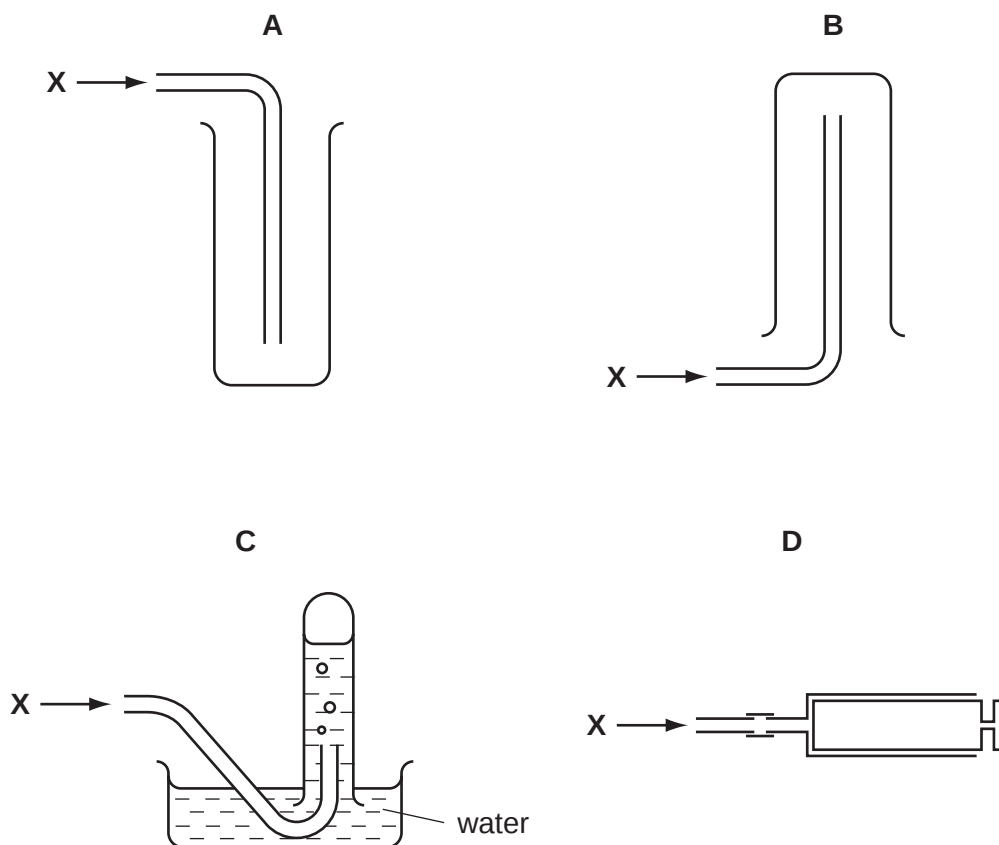
Z is absorbed by thin card.

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?



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- 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?

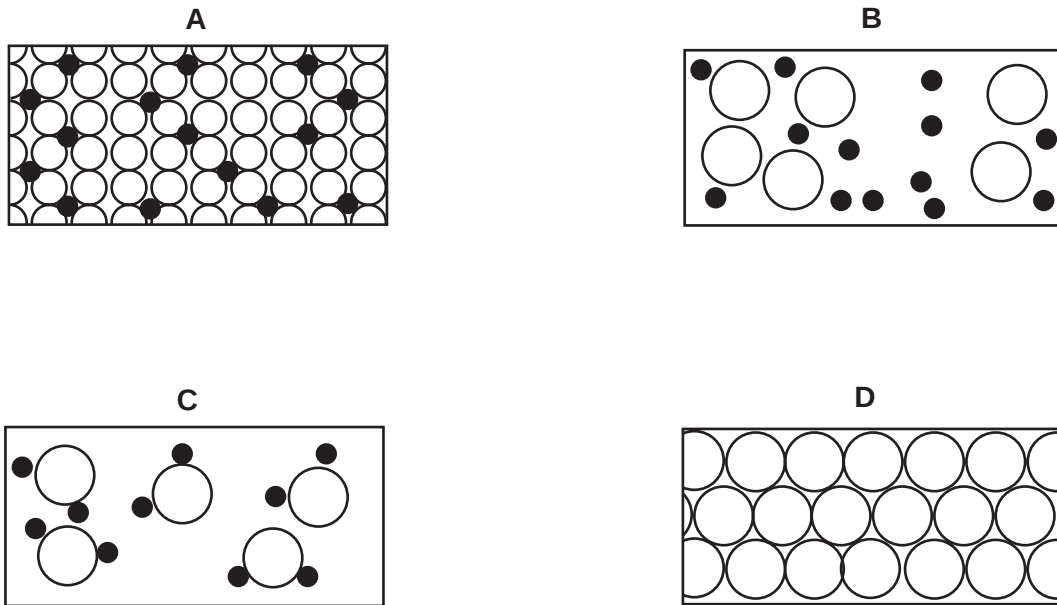
- A They all have an even number of electrons.
- B They all have a stable arrangement of electrons.
- C They all have eight electrons in the outer shell.
- D They all have two electrons in the first shell.

- 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+} .

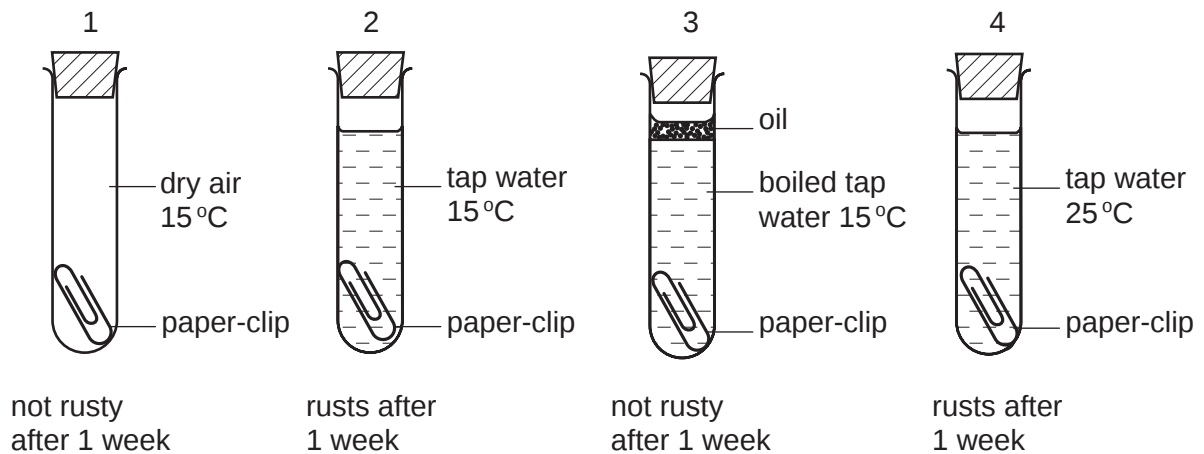
Which two metals are displaced from this solution?

- 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?



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

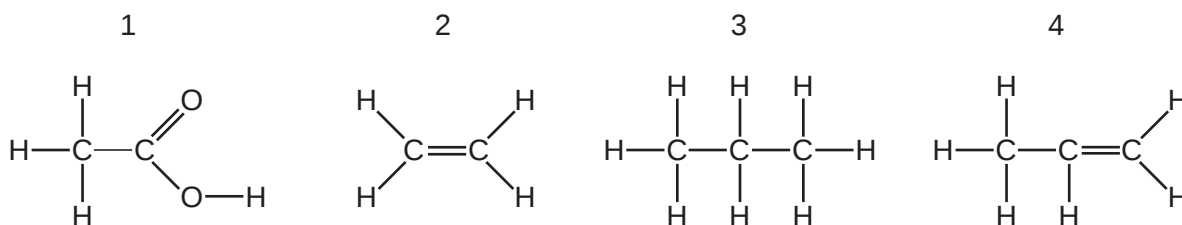
24 Which conditions are used for the manufacture of ammonia by the Haber process?

	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** CH₄ **B** C₂H₆ **C** C₃H₈ **D** C₄H₈

26 The structures of four organic compounds are shown.



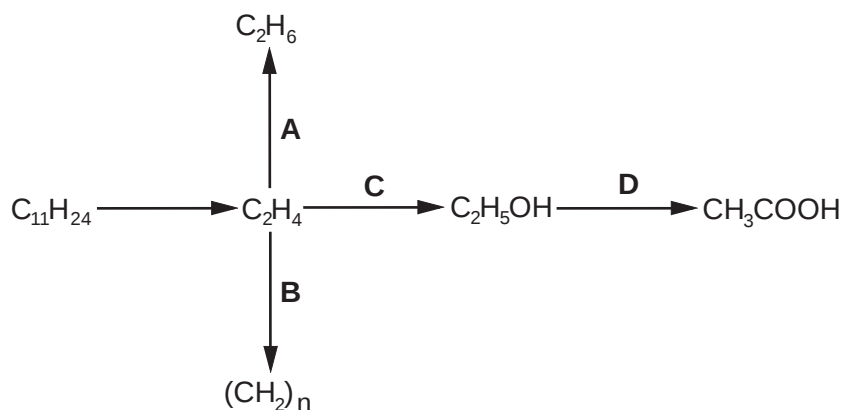
Which compounds decolourise aqueous bromine?

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

27 The hydrocarbon C₁₁H₂₄ is present in crude oil.

The diagram shows reactions by which various products can be obtained from C₁₁H₂₄.

In which step does oxidation take place?

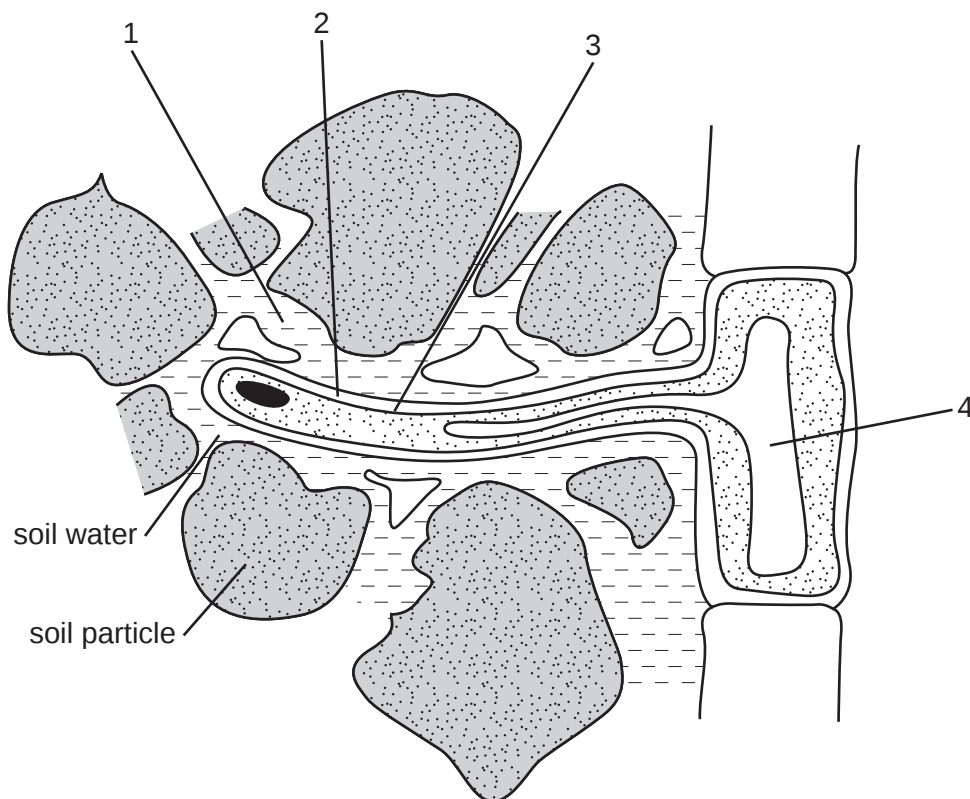


28 A cell is being examined.

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?

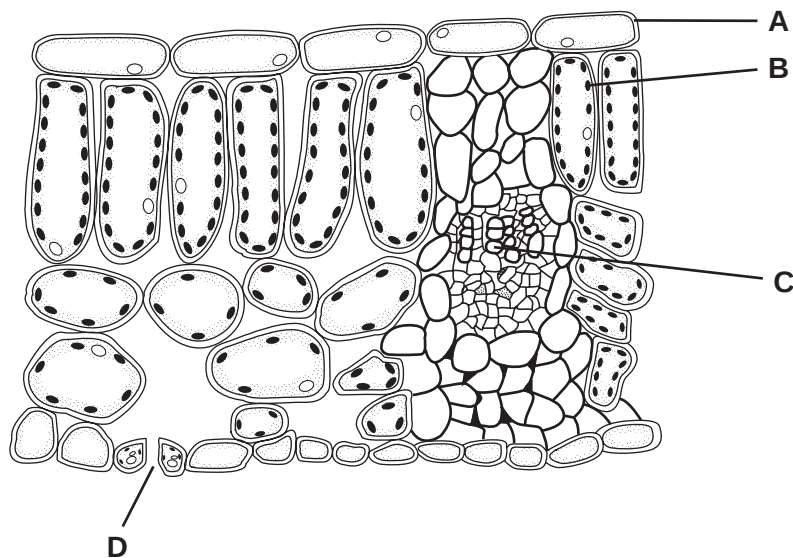
	higher concentration of water molecules	partially permeable membrane	lower concentration of water molecules
A	1	2	4
B	1	3	4
C	4	2	1
D	4	3	1

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?

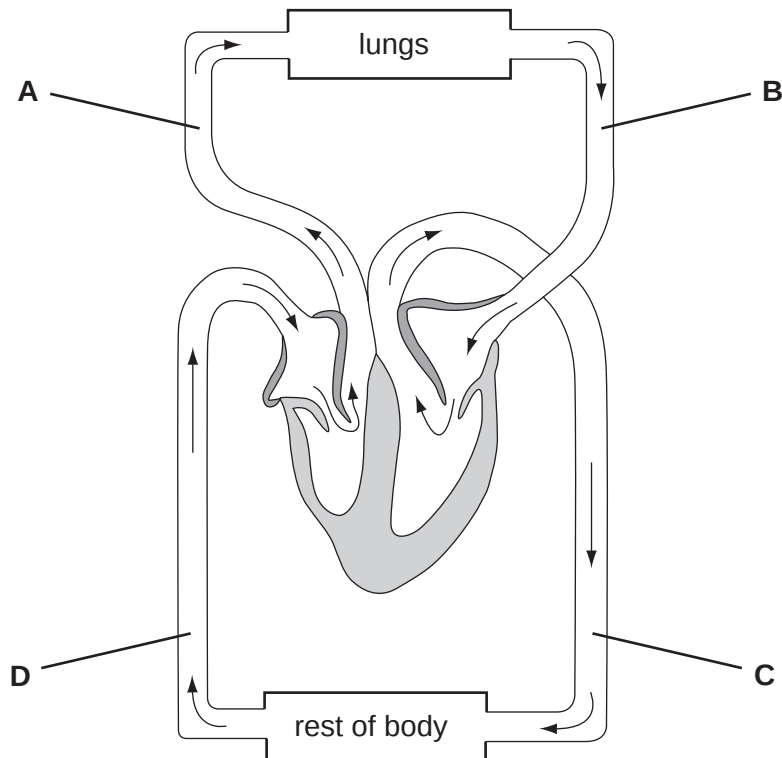
- A Bacteria release acids.
- B Enzymes in saliva release acids.
- C Salivary glands release acids.
- D Taste receptors release acids.

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?

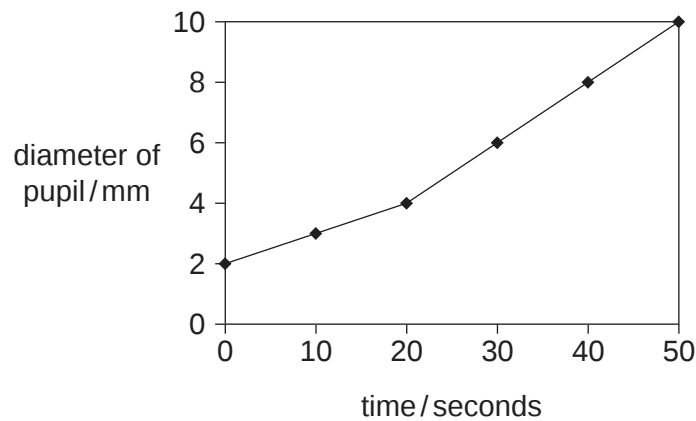
- A alcohol and carbon dioxide
- B carbon dioxide and glucose
- C glucose and oxygen
- D oxygen and alcohol

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	✓	x	✓
B	✓	✓	x
C	x	x	✓
D	x	✓	x

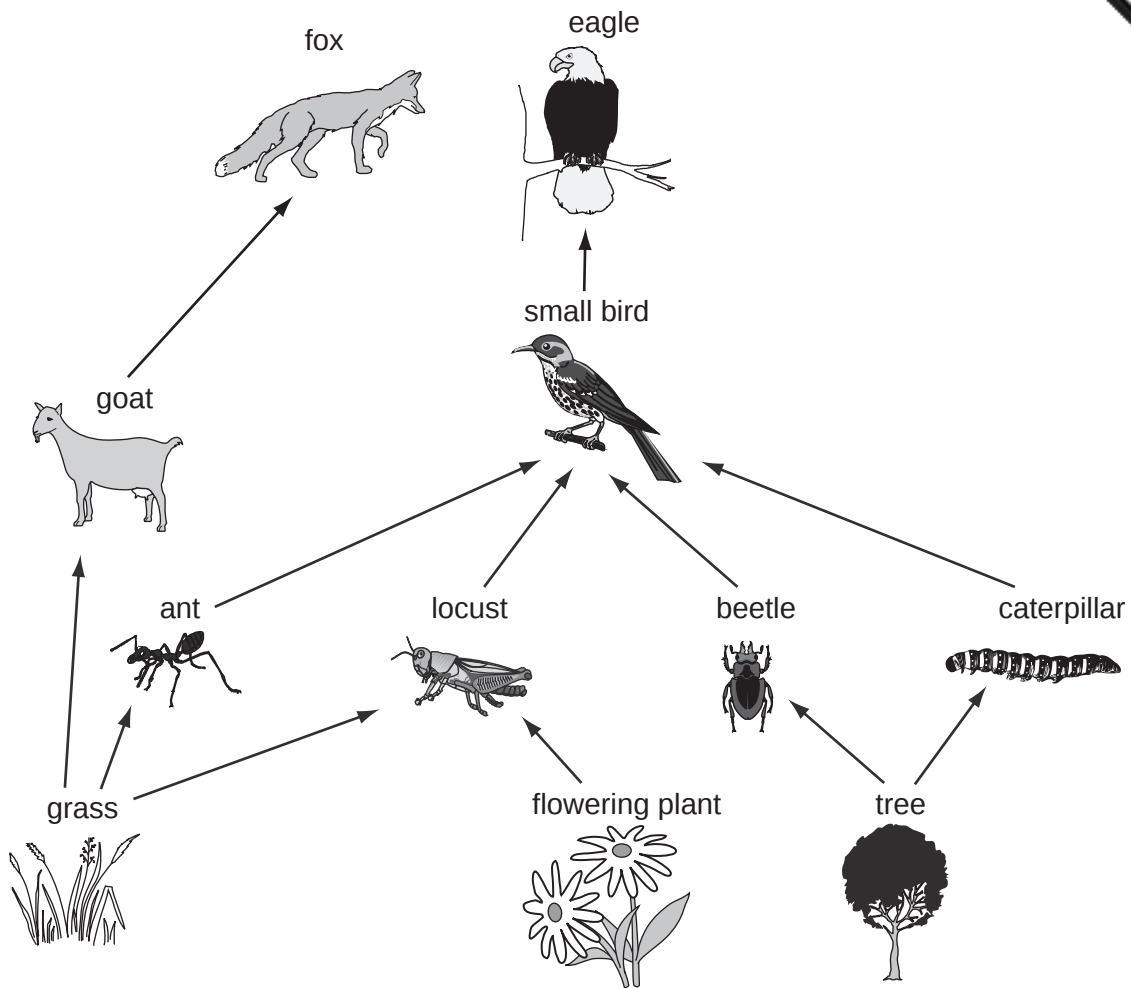
key

✓ = effect occurs

x = effect does not occur

15

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	1 H Hydrogen 1					III	IV	V	VI	VII	0									
3 7 Li Lithium	4 9 Be Beryllium												2 4 He Helium								
11 23 Na Sodium	12 24 Mg Magnesium												10 20 Ne Neon								
19 39 K Potassium	20 40 Ca Calcium	21 45 Sc Scandium	22 48 Ti Titanium	23 51 V Vanadium	24 52 Cr Chromium	25 55 Mn Manganese	26 56 Fe Iron	27 59 Co Cobalt	28 59 Ni Nickel	29 64 Cu Copper	30 65 Zn Zinc	31 70 Ga Gallium	32 73 Ge Germanium	33 75 As Arsenic	34 79 Se Selenium	35 80 Br Bromine	36 84 Kr Krypton	54 131 Xe Xenon	86 Rn Radon		
37 85 Rb Rubidium	38 88 Sr Strontium	39 89 Y Yttrium	40 91 Zr Zirconium	41 93 Nb Niobium	42 96 Mo Molybdenum	43 96 Tc Technetium	44 101 Ru Ruthenium	45 103 Rh Rhodium	46 106 Pd Palladium	47 108 Ag Silver	48 112 Cd Cadmium	49 115 In Indium	50 119 Sn Tin	51 122 Sb Antimony	52 128 Te Tellurium	53 127 I Iodine	54 131 Xe Xenon	86 Rn Radon			
55 133 Cs Caesium	56 137 Ba Barium	57 139 La Lanthanum	72 178 Hf Hafnium	73 181 Ta Tantalum	74 184 W Tungsten	75 186 Re Rhenium	76 190 Os Osmium	77 192 Ir Iridium	78 195 Pt Platinum	79 197 Au Gold	80 201 Hg Mercury	81 204 Tl Thallium	82 207 Pb Lead	83 209 Bi Bismuth	84 210 Po Polonium	85 210 At Astatine	86 Rn Radon				
87 Fr Francium	88 226 Ra Radium	89 227 Ac Actinium												71 175 Lu Lutetium							
58-71 Lanthanoid series											90-103 Actinoid series										
Key	X	a	a = relative atomic mass											103 Lr Lawrencium							
			X = atomic symbol																		
			b = proton (atomic) number																		

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

Key

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

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