UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

ADDITIONAL COMBINED SCIENCE **5130/01**

Paper 1 Multiple Choice **October/November 2010**

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.

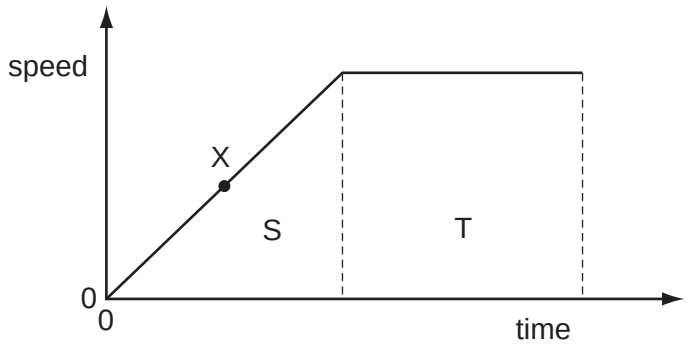
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 20.

This document consists of **17** printed pages and **3** blank pages.

1 The graph illustrates the motion of an object.



Which feature of the graph represents the distance travelled by the object whilst moving at a constant speed?

A area S

B area S + area T

C area T

D the gradient at point X

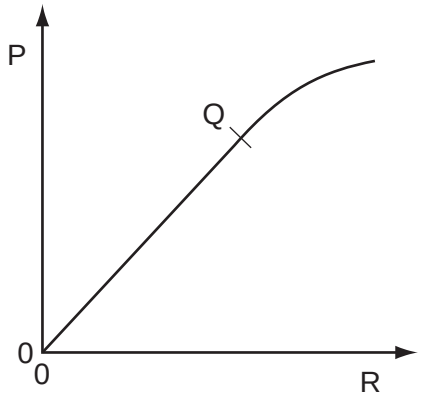
2 Ten identical steel balls, each of mass 27 g, are immersed in a measuring cylinder containing 20 cm^3 of water.

The reading of the water level rises to 50 cm^3.

What is the density of the steel?

A 0.9 g/cm^3 **B** 8.1 g/cm^3 **C** 9.0 g/cm^3 **D** 13.5 g/cm^3

3 The graph demonstrates the deformation of an elastic solid.



What do P, Q and R represent?

	P	Q	R
A	extension	limit of proportionality	load
B	extension	load	limit of proportionality
C	limit of proportionality	extension	load
D	load	limit of proportionality	extension

4 A motor is used to raise bricks from the ground to the first floor of a building.

The following measurements are made.

- height of the first floor
- input power to the motor
- time taken to raise the bricks
- weight of the bricks

How many of these measurements will be needed to find the efficiency of the motor?

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

5 The outside of a spacecraft is painted so that it absorbs as little of the Sun's radiation as possible.

Which paint is the most suitable?

A dull black

B dull white

C shiny black

D shiny white

6 What will **not** affect the rate of evaporation from the surface of a liquid?

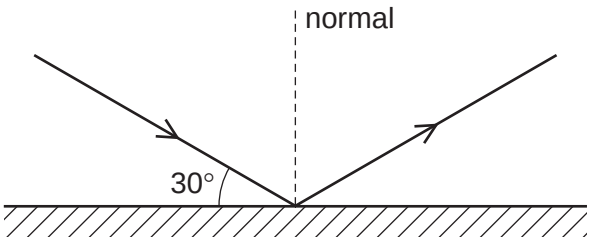
A depth of the liquid

B draughts above the surface of the liquid

C surface area of the liquid

D temperature of the liquid

7 The diagram shows a ray of light reflected from a plane mirror.



What is the angle of reflection?

A 30° **B** 60° **C** 90° **D** 120°

8 In which medium does sound travel the quickest?

A air

B glass

C vacuum

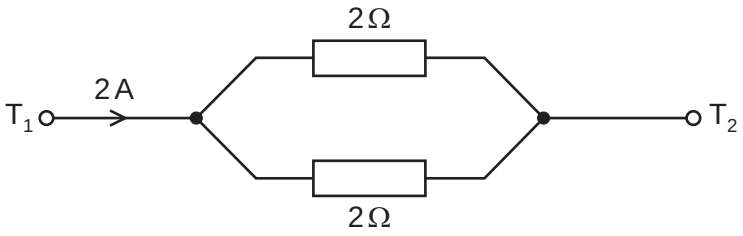
D water

9 A current of 2 A flows for 5 s through a lamp.

How much charge flows through the lamp?

A 0.4 C **B** 2.5 C **C** 7.0 C **D** 10.0 C

10 A total current of 2 A flows between the terminals T_1 and T_2 in the circuit shown.



What is the potential difference between T_1 and T_2?

A 0.5 V **B** 1 V **C** 2 V **D** 4 V

11 When working normally, an electric kettle uses a current of 10 A.

What is the current in each of the earth, live and neutral wires?

	earth	live	neutral
A	0 A	0 A	10 A
B	0 A	10 A	0 A
C	0 A	10 A	10 A
D	10 A	10 A	0 A

12 The neutral atoms of all isotopes of the same element contain the same number of

A electrons and neutrons.

B electrons and protons.

C neutrons only.

D neutrons and protons.

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	gamma	alpha
C	gamma	alpha	beta
D	gamma	beta	alpha

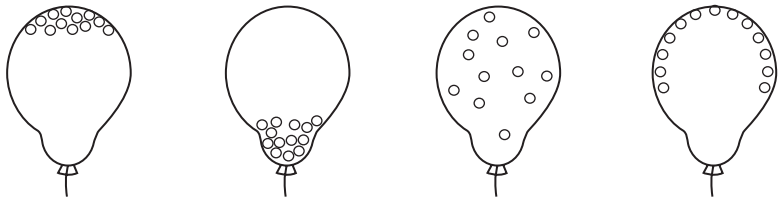
14 The table shows the results of two tests done on aqueous solutions of some cations.

Which row is correct?

	cation	adding aqueous sodium hydroxide	adding aqueous ammonia
A	aluminium, Al^{3+}	white precipitate	yellow precipitate
B	ammonium, NH_4^+	white precipitate	no precipitate
C	calcium, Ca^{2+}	white precipitate	no precipitate
D	copper(II), Cu^{2+}	blue precipitate	green precipitate

15 Which diagram shows the arrangement of atoms inside a balloon containing helium?

A **B** **C** **D**



16 The table shows the number of protons, neutrons and electrons in four ions.

For which ion is the data correct?

	ion	protons	neutrons	electrons
A	$^{40}_{20}Ca^{2+}$	20	20	20
B	$^{19}_{9}F^{-}$	9	10	8
C	$^{18}_{8}O^{2-}$	10	8	12
D	$^{23}_{11}Na^{+}$	11	12	10

17 Why do metals conduct electricity?

A They are bonded by a sea of protons.

B They contain a lattice of metal atoms.

C They have electrons which are free to move.

D They have positive ions which are free to move.

18 The main ore of zinc is zinc blende, ZnS (M_r 97).

When this ore is heated in air, the reaction is represented by the following equation.

$$2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$$

Which volume of oxygen, at room temperature and pressure, would be needed to react completely with 194 g of ZnS?

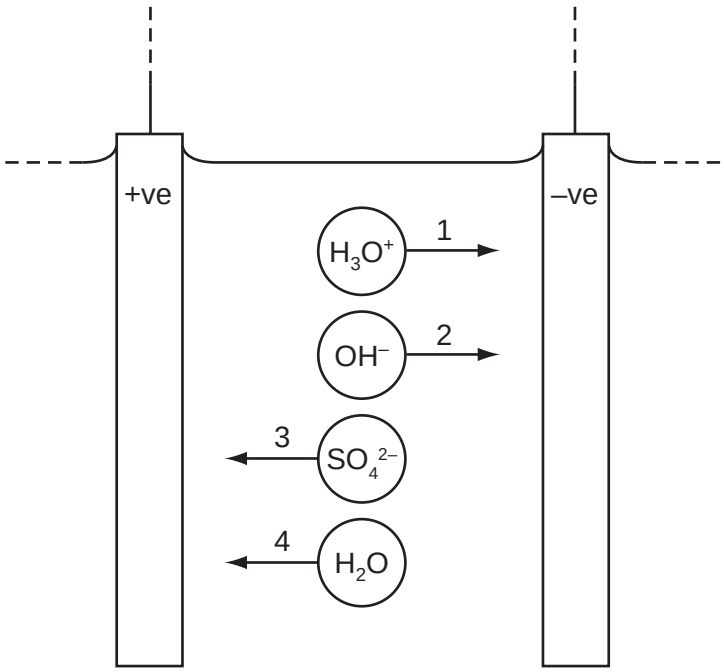
A $\frac{3 \times 24}{2}\,dm^3$

B $3 \times 24\,dm^3$

C $3 \times 32\,dm^3$

D $3 \times 24 \times 32\,dm^3$

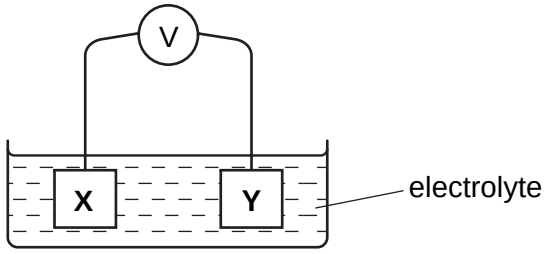
19 In the diagram, the arrows show possible movements of the particles in the electrolysis of dilute sulfuric acid.



Which arrows are correct?

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

20 The diagram shows a simple cell, in which metals X and Y are the electrodes.



Which pair of metals would be expected to produce the highest voltage?

	X	Y
A	Mg	Cu
B	Mg	Fe
C	Zn	Cu
D	Zn	Fe

21 Sodium sulfate is prepared by neutralising a solution of sulfuric acid with sodium hydroxide.

What is the ionic equation for this reaction?

A $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$

B $2H^+(aq) + 2OH^-(aq) \rightarrow 2H_2(g) + O_2(g)$

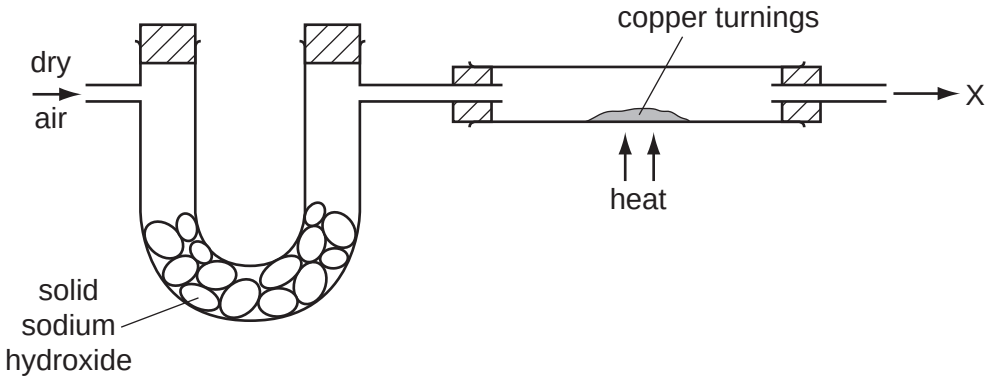
C $Na^+(aq) + HSO_4^-(aq) \rightarrow NaHSO_4(aq)$

D $2Na^+(aq) + SO_4^{2-}(aq) \rightarrow Na_2SO_4(aq)$

22 Which two properties are typical of most metals?

	property 1	property 2
A	they are soluble in water	they react with acids
B	they are soluble in water	their oxides react with alkalis
C	they can be drawn into wires	they react with alkalis
D	they can be drawn into wires	their oxides react with acids

23 A stream of dry air is passed through the apparatus shown.



Which gases leave the apparatus at X?

A nitrogen and the noble gases only

B nitrogen, the noble gases and carbon dioxide

C nitrogen, the noble gases and water vapour

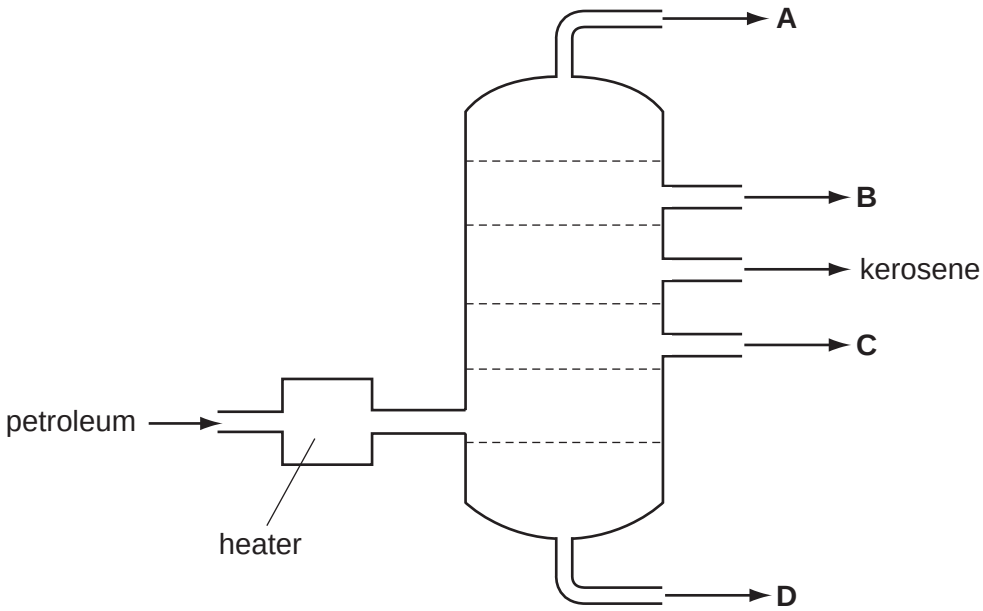
D nitrogen, water vapour and carbon dioxide

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

	temperature/°C	pressure	catalyst
A	100	high	yes
B	100	low	no
C	500	high	yes
D	500	low	no

25 The diagram represents the process of fractional distillation of petroleum.

At which outlet is petrol (gasoline) obtained?



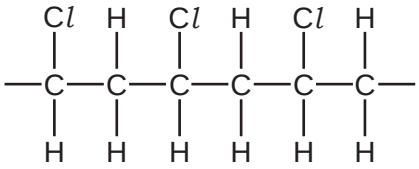
26 Compound X has the molecular formula C_2H_6O.

- X can be made by a fermentation process.
- X can be oxidised to Y.
- X can react with Y to form Z and water.

To which homologous series do X, Y and Z belong?

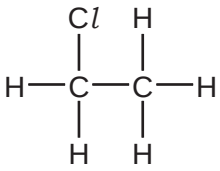
	X	Y	Z
A	alcohols	carboxylic acids	esters
B	alcohols	esters	carboxylic acids
C	carboxylic acids	alcohols	esters
D	carboxylic acids	esters	alcohols

27 An addition polymer has the following structure.

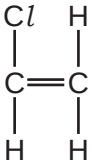


What is the structure of the monomer?

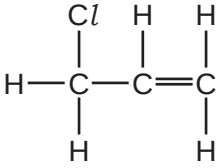
A



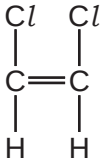
B



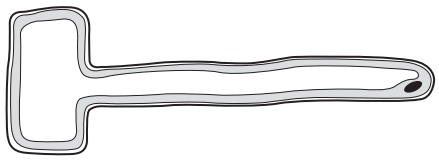
C



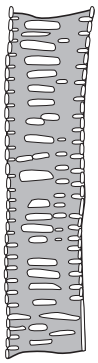
D



28 The diagram shows two plant cells.



cell X



cell Y

Which of these cells depends on water inside it to provide support?

	cell X	cell Y
A	no	no
B	no	yes
C	yes	no
D	yes	yes

29 What is the correct equation for photosynthesis?

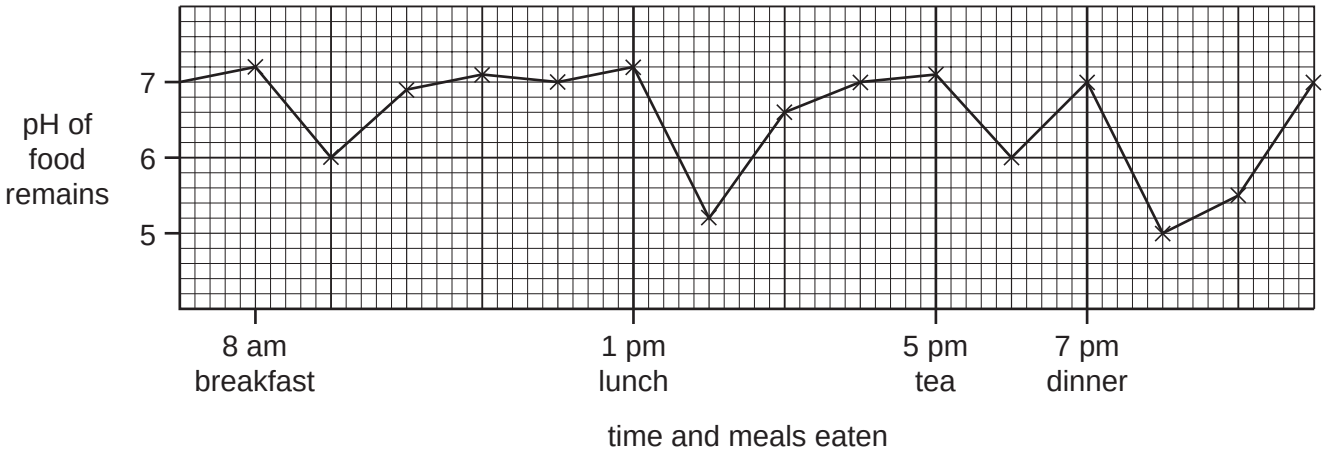
A carbohydrate + carbon dioxide → oxygen + water

B carbohydrate + oxygen → water + carbon dioxide

C carbon dioxide + oxygen → carbohydrate + water

D carbon dioxide + water → carbohydrate + oxygen

30 The graph shows the pH of food remains on the teeth.



What can be concluded from this graph?

A After eating, food remains become more acid.

B Bacteria act on food remains.

C Dental decay is more likely to occur before eating.

D Dinner contained less sugar than breakfast.

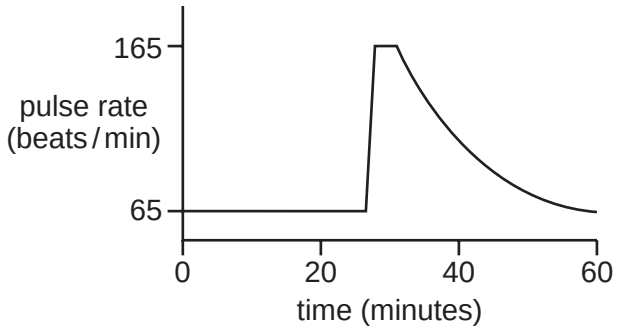
31 The graph shows changes in a person's pulse rate over a period of 60 minutes.

The sequence of events involves:

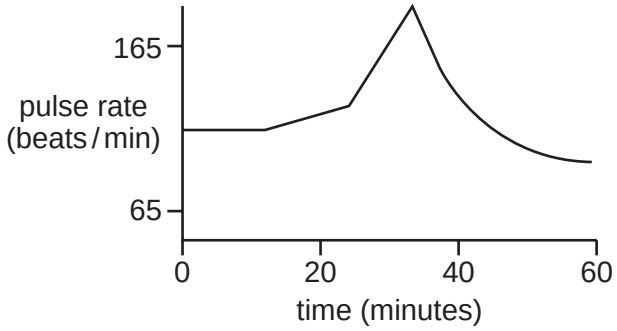
- waiting in a queue
- entering a sports stadium
- seeing a goal scored
- relaxing during half time.

Which graph shows this sequence of events?

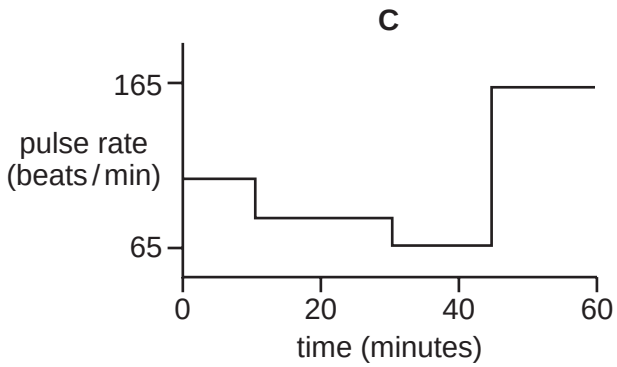
A



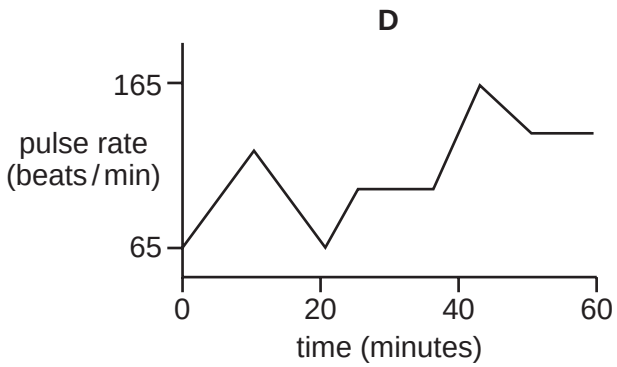
B



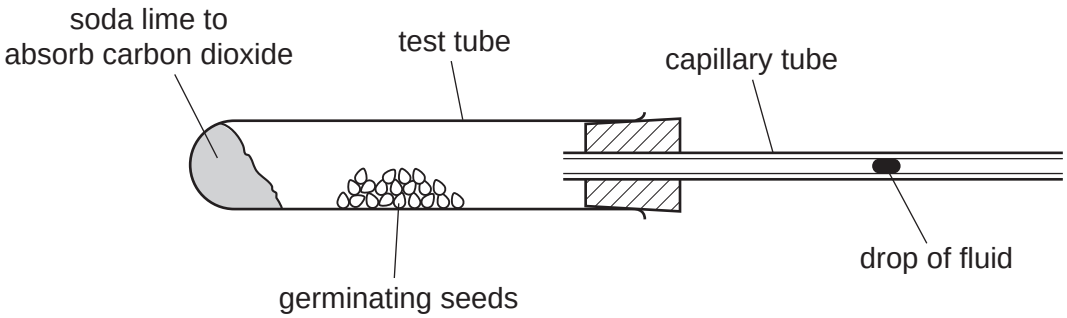
C



D



32 The apparatus shown is set up for an experiment to investigate respiration.



What will happen to the drop of fluid in the capillary tube over the next few hours?

A It will move to the right because of oxygen output by the seeds.

B It will move to the left because of carbon dioxide intake by the seeds.

C It will move to the left because of oxygen intake by the seeds.

D It will not move because carbon dioxide intake and oxygen output are equal.

33 A kidney patient needs to have dialysis treatment.

How do molecules move during dialysis by a kidney machine?

	process involved	concentration gradient
A	active uptake	high to low
B	active uptake	low to high
C	diffusion	high to low
D	diffusion	low to high

34 What happens when the body temperature falls below 37 °C?

	blood flow to skin	sweating
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

35 A man stands 10 metres away from a sign and can see it clearly. He walks towards the sign and stops 0.5 metres from it.

Which changes occur in his eyes so that the sign is still in focus?

	ciliary muscles	suspensory ligaments	lens becomes	result is light rays refracted
A	contract	slacken	thicker	more
B	contract	tighten	thinner	less
C	relax	slacken	thinner	less
D	relax	tighten	thicker	more

36 The following sentence is about antibiotics.

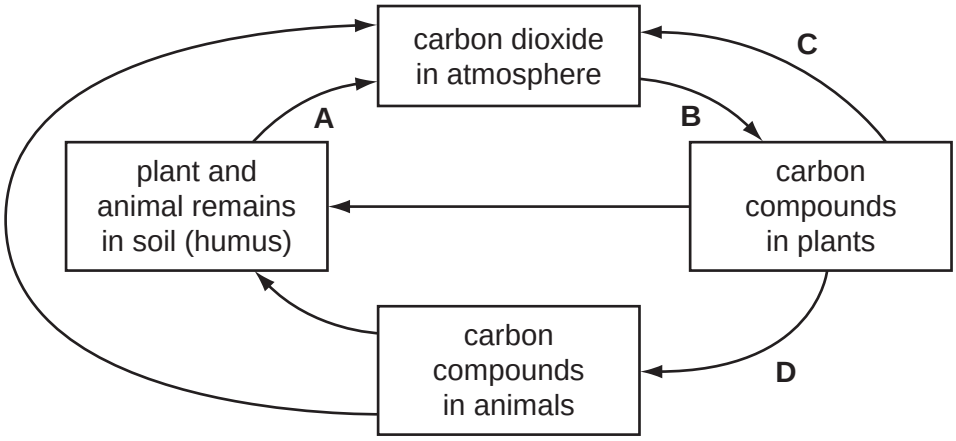
Antibiotics are chemicals which are made naturally by ……1…… and which are used to treat ……2…… infections.

Which words correctly complete the sentence?

	1	2
A	animals	viral
B	bacteria	fungal
C	micro-organisms	bacterial
D	plants	decomposer

37 The diagram shows part of the carbon cycle.

Which arrow represents photosynthesis?



38 Which process does **not** occur as a result of deforestation in a tropical rainforest?

A formation of new soil

B increased soil erosion

C increased soil temperature

D reduced transpiration

39 What happens to the dry mass and the total mass of a germinating seed during the first few days of germination?

	dry mass	total mass
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

40 What determines the sex of a child?

A chromosome content of the egg

B chromosome content of the sperm

C number of days between fertilisation and implantation

D number of days between ovulation and fertilisation

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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 Phosphorus 15	32 S Sulfur 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
	Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

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

Key

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

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