

COMBINED SCIENCE

5129/12

Paper 1 Multiple Choice

October/November 2014

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, 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.

DO NOT WRITE IN ANY BARCODES.

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.

Electronic calculators may be used.

This document consists of **14** printed pages and **2** blank pages.

- 1 Red blood cells have a relatively large surface area.

How does this help the red blood cell carry out its function?

- A It can absorb oxygen more quickly.
- B It can carry more oxygen.
- C It can maintain a concentration gradient.
- D It can pass through small blood vessels.

- 2 Some animal cells are placed in a concentrated sugar solution.

What happens to the cells?

- A They lose sugar and shrivel up.
- B They lose water and shrivel up.
- C They take in sugar and burst.
- D They take in water and burst.

- 3 Three test-tubes contain equal amounts of a liquid food. The pH of the liquid food in each tube is different.

Equal quantities of the same enzyme are added to each tube.

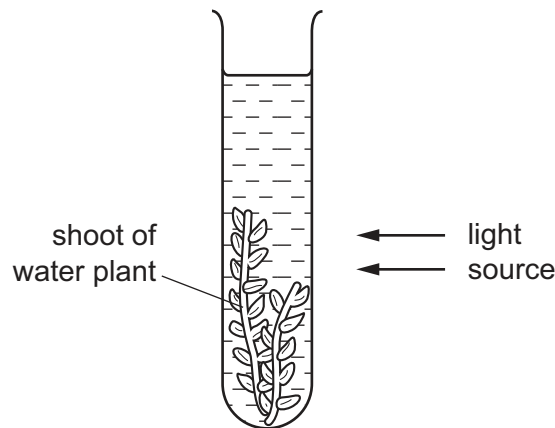
The fastest digestion of the liquid food occurs in the test-tube at pH 2.

Which part of the alimentary canal was the enzyme extracted from?

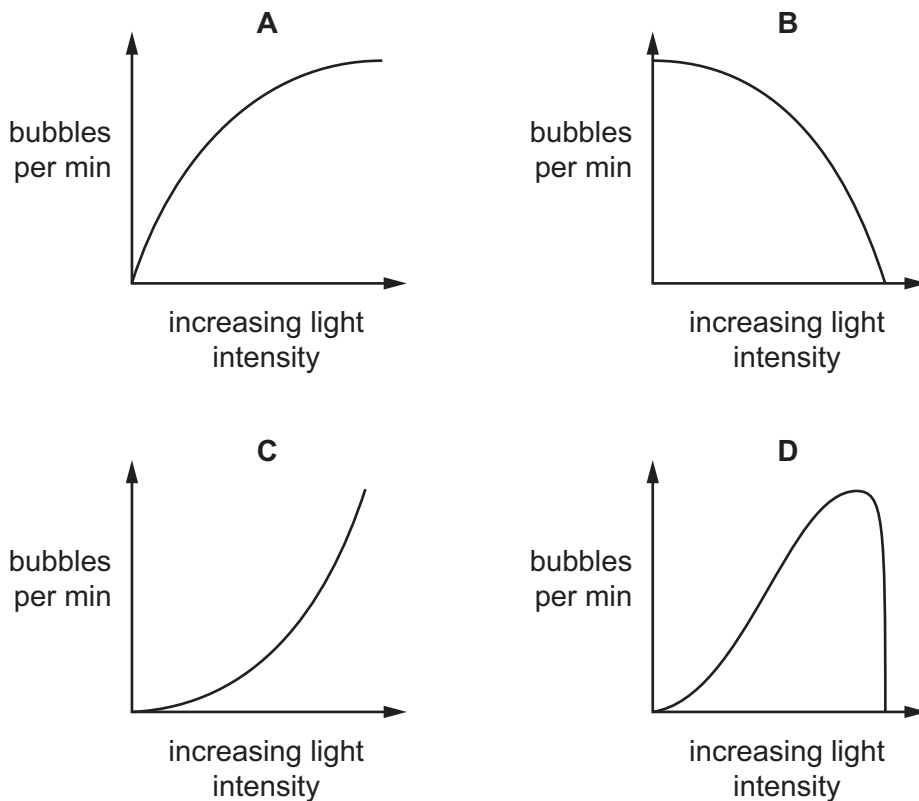
- A large intestine
- B mouth
- C small intestine
- D stomach

- 4 The diagram shows an investigation into the effect of light intensity on the rate of photosynthesis. The rate is measured by counting the number of bubbles released per minute.

The experiment is repeated using different light intensities.



Which graph shows the result of the investigation?



- 5 Nitrogen-containing ions are found in fertilisers.

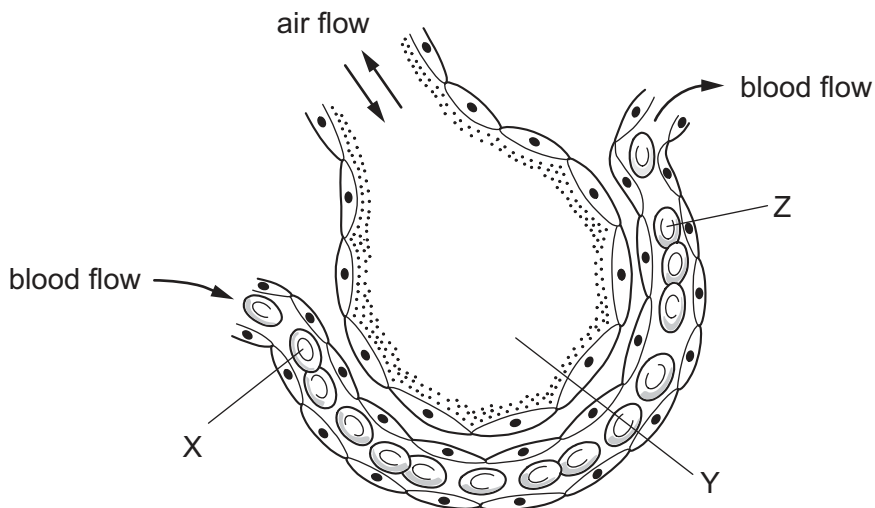
How do plants use these ions?

- A enzyme synthesis
- B photosynthesis
- C respiration
- D transpiration

- 6 Blood donated in a hospital sometimes has the fibrinogen removed from it.

What is the effect of removing fibrinogen from the blood?

- A** The blood would carry less oxygen.
B The blood would not be rejected by a recipient.
C The blood would not clot.
D The blood would not produce antibodies.
- 7 What are the products of anaerobic respiration in muscle cells?
- A** carbon dioxide and a large amount of energy
B carbon dioxide and a small amount of energy
C lactic acid and a large amount of energy
D lactic acid and a small amount of energy
- 8 The diagram shows a section through an alveolus and a blood capillary.



Which row describes the oxygen concentrations at X, Y and Z?

	X	Y	Z
A	high	low	high
B	high	low	low
C	low	high	high
D	low	high	low

9 What is the excretory product in blood that is removed by the lungs?

- A carbon dioxide
- B glucose
- C lactic acid
- D urea

10 Which processes take place in the eye when a person moves into dim light?

	size of pupil	circular muscles of iris	radial muscles of iris
A	enlarges	contract	relax
B	enlarges	relax	contract
C	reduces	contract	relax
D	reduces	relax	contract

11 When a car driver has been drinking alcohol there is more chance of an accident.

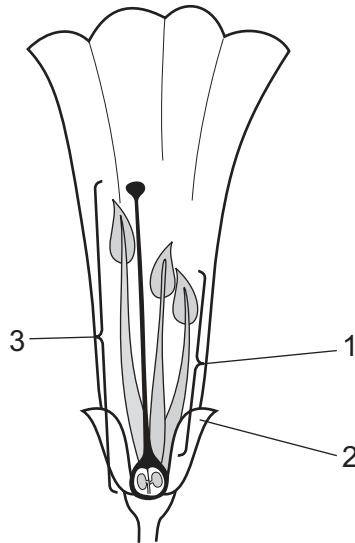
This is because the alcohol

- A affects the driver's liver.
- B increases reaction time.
- C is addictive.
- D is a stimulant.

12 Which human action is harmful to the ecosystem?

- A creating new habitats for organisms
- B cutting down more trees
- C increasing the number of nature reserves
- D slowing down the rate of human population growth

13 The diagram shows the structure of an insect-pollinated flower.

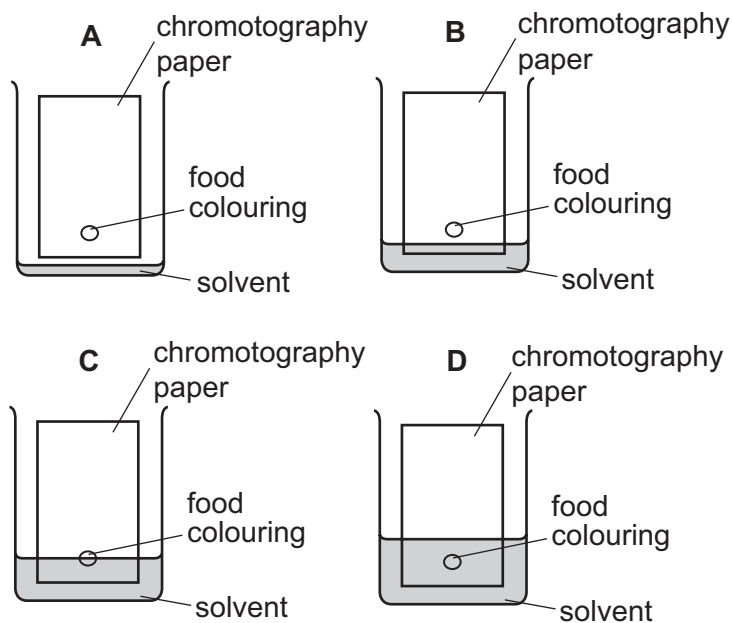


What are the numbered parts?

	1	2	3
A	carpel	sepal	stamen
B	carpel	stamen	sepal
C	stamen	carpel	sepal
D	stamen	sepal	carpel

14 A student investigates a food colouring using chromatography.

Which diagram shows the correct arrangement of apparatus at the beginning of the experiment?



15 Details of two atoms are shown.



Which statement is correct?

- A Q and R are in the same group of the Periodic Table.
- B Q and R are in the same period of the Periodic Table.
- C Q and R have the same number of neutrons.
- D Q and R have the same number of nucleons in the nucleus.

16 Which atom forms an ion with a charge of 2+?

	proton (atomic) number
A	6
B	8
C	12
D	16

17 The table shows the electronic structure of four elements.

element	electronic structure
W	2,6
X	2,8
Y	2,8,1
Z	2,8,7

Which pair of atoms form a covalent molecule?

- A two atoms of W
- B two atoms of X
- C an atom of W and an atom of X
- D an atom of Y and an atom of Z

22 The following statements show properties of three metals, W, X and Y.

Water is formed when hydrogen gas is passed over the heated oxide of metal W.

Metal X does not react with water but reacts with steam to produce hydrogen gas.

Metal Y reacts with cold water to produce hydrogen gas.

What is the order of reactivity of the elements?

	most reactive	—————→			least reactive
A	hydrogen	Y	W	X	
B	W	hydrogen	X	Y	
C	X	W	Y	hydrogen	
D	Y	X	hydrogen	W	

23 Which two gases are both pollutants of the atmosphere?

- A carbon monoxide and oxygen
- B carbon monoxide and sulfur dioxide
- C nitrogen and oxygen
- D nitrogen and sulfur dioxide

24 Which gases are used to make ammonia in the Haber process?

- A nitrogen and hydrogen
- B nitrogen and methane
- C nitrogen and water vapour
- D nitrogen oxide and hydrogen

25 Alkanes have the general formula C_nH_{2n+2}

What is the formula of hexane, an alkane containing six carbon atoms?

- A C_6H_{10} B C_6H_{12} C C_6H_{14} D C_6H_{16}

26 Which statement about alkenes is **not** correct?

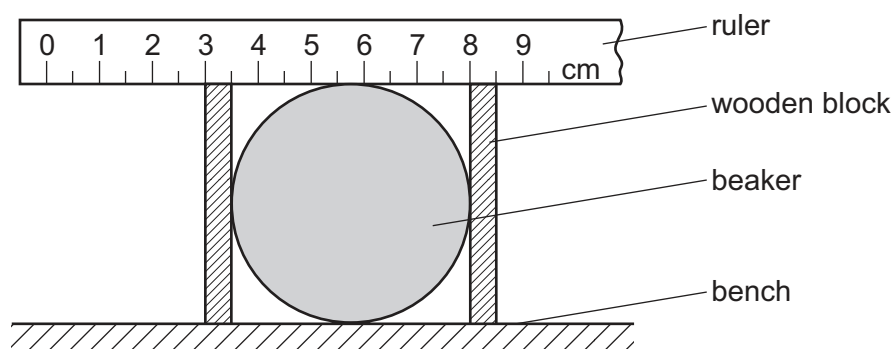
- A They are saturated hydrocarbons.
- B They burn to form carbon dioxide and water.
- C They can be used to form polymers, e.g. polythene from ethene.
- D They have structures containing a C=C bond.

27 Ethanol is a fuel.

What are the products when ethanol burns in a plentiful supply of oxygen?

- A carbon, hydrogen and water
- B carbon dioxide and water
- C carbon monoxide and hydrogen
- D carbon monoxide and water

28 The diagram shows a method of measuring the diameter of a beaker.



What is the diameter of the beaker?

- A 4.5 cm
- B 5.0 cm
- C 5.5 cm
- D 8.0 cm

29 A force is exerted on an object so that it accelerates.

Which change would double the size of the acceleration?

- A doubling the force and halving the mass of the object
- B doubling the force only
- C doubling the mass of the object and halving the force
- D doubling the mass only

30 When an object is taken from the Earth to the Moon, what changes occur in mass and weight?

	mass	weight
A	decrease	decrease
B	decrease	increase
C	no change	no change
D	no change	decrease

31 Which type of energy is converted to thermal energy when **atoms** combine?

- A chemical
- B kinetic
- C nuclear
- D solar

32 Four kettles have different power ratings.

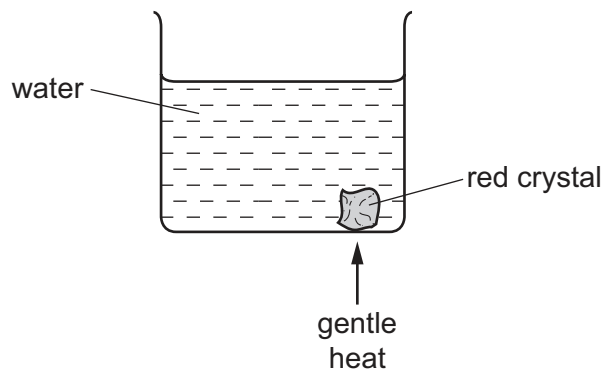
The energy converted and the time taken for the conversion for each kettle is shown in the table.

Which kettle has the highest power rating?

	energy converted	time taken
A	1000 J	2 s
B	3000 J	2 s
C	4000 J	5 s
D	6000 J	5 s

33 A beaker of water contains a red crystal which is slowly dissolving.

Gentle heat is applied below the crystal.



The red colour rises.

What is the name of this process?

- A conduction
- B convection
- C evaporation
- D radiation

34 The uniform increase in the volume of a liquid with temperature is used to measure temperature.

At 20.0°C the volume of a liquid is 40 mm^3 .

At 60.0°C the volume of the same liquid is 44 mm^3 .

Which temperature is indicated by a volume of 46 mm^3 of this liquid?

- A** 62.7°C **B** 80.0°C **C** 82.7°C **D** 90.0°C

35 Twelve complete water waves pass a point in 4.0 s. The wavelength of the waves is 2.0 cm.

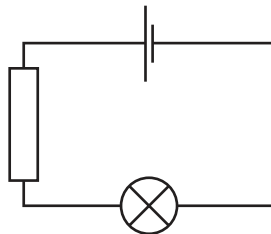
What is the speed of the waves?

- A** 0.67 cm/s **B** 1.5 cm/s **C** 6.0 cm/s **D** 8.0 cm/s

36 Which pair of statements correctly compares X-rays and radio waves?

- A** One is longitudinal and the other is transverse; they have the same speed in a vacuum.
B One is longitudinal and the other is transverse; they have the same wavelengths and frequencies in a vacuum.
C They are both longitudinal; they have the same wavelengths and frequencies in a vacuum.
D They are both transverse; they have the same speed in a vacuum.

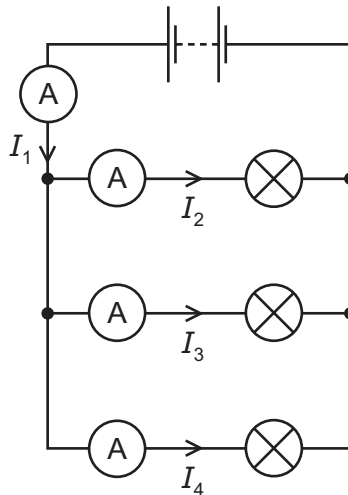
37 In the circuit shown, 2.0 C move through the lamp in a time of 6.0 s.



What is the current in the circuit?

- A** 12 A **B** 4.0 A **C** 3.0 A **D** 0.33 A

38 A student sets up the circuit shown.



The currents measured by the ammeters are shown.

Which equation is correct?

A $I_1 = I_2 + I_3 + I_4$

B $I_1 = I_2 = I_3 = I_4$

C $I_2 + I_3 = I_4 + I_1$

D $I_4 = I_3 + I_2 + I_1$

39 A 750 W microwave oven is used in a house where the mains voltage is 240 V.

Which fuse should be used in the plug?

A 3 A

B 5 A

C 10 A

D 13 A

40 What do all nuclei of carbon contain?

A electrons only

B neutrons only

C electrons and neutrons

D neutrons and protons

DATA SHEET
The Periodic Table of the Elements

		Group																																														
I	II	III	IV	V	VI	VII	0																																									
		1 H Hydrogen 1										4 He Helium 2																																				
7 Li Lithium 3	9 Be Beryllium 4											20 Ne Neon 10																																				
23 Na Sodium 11	24 Mg Magnesium 12											35.5 Cl Chlorine 17																																				
39 K Potassium 19	40 Ca Calcium 20											84 Kr Krypton 36																																				
85 Rb Rubidium 37	88 Sr Strontium 38											131 Xe Xenon 54																																				
133 Cs Caesium 55	137 Ba Barium 56											209 Bi Bismuth 83																																				
226 Ra Radium 88	227 Ac Actinium 89											86 Rn Radon 86																																				
<p>*58-71 Lanthanoid series †90-103 Actinoid series</p>																																																
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">a</td> <td style="border: 1px solid black; padding: 2px;">X</td> <td style="border: 1px solid black; padding: 2px;">b</td> </tr> <tr> <td style="padding: 2px;">Key</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> </table> <p>a = relative atomic mass X = atomic symbol b = proton (atomic) number</p>													a	X	b	Key																																
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Key																																																
		11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	59 Co Cobalt 27	64 Cu Copper 29	79 Se Selenium 34	80 Br Bromine 35	115 In Indium 49	119 Sn Tin 50	127 I Iodine 53	157 Gd Gadolinium 64	162 Dy Dysprosium 66	167 Er Erbium 68	173 Yb Ytterbium 70	183 La Lanthanum 57	188 Ce Cerium 58	192 Th Thorium 90	204 Pb Lead 82	207 Po Polonium 84	210 At Astatine 85	226 Ra Radium 88	227 Ac Actinium 89	232 Th Thorium 90	238 U Uranium 92	288 Fr Francium 87	289 Ra Radium 88	290 Ac Actinium 89	291 Th Thorium 90	292 Pa Protactinium 91	293 U Uranium 92	294 Np Neptunium 93	295 Pu Plutonium 94	296 Am Americium 95	297 Cm Curium 96	298 Bk Berkelium 97	299 Cf Californium 98	300 Es Einsteinium 99	301 Fm Fermium 100	302 Md Mendelevium 101	303 No Nobelium 102	304 Lr Lawrencium 103

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

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