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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE **5129/11**

Paper 1 Multiple Choice **October/November 2013**

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

8821523886

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.
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 20.
Electronic calculators may be used.

This document consists of **18** printed pages and **2** blank pages.

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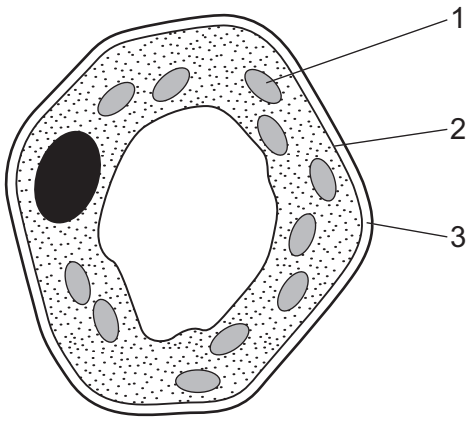
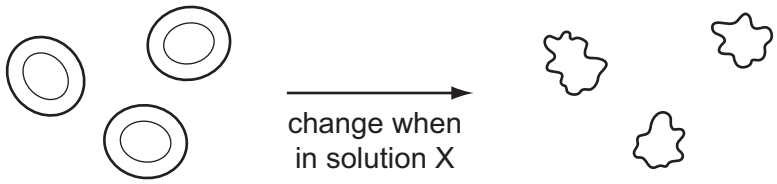
1 The diagram shows a plant cell as seen under a microscope.



Which of the numbered parts carry out these functions?

	controlling entry of dissolved substances	formation of carbohydrates
A	1	3
B	2	1
C	3	2
D	3	1

2 The diagram represents how some red blood cells change when they are placed in solution X.



What describes the water concentration in solution X and in which direction does water move?

	water concentration in solution X	direction of water movement
A	higher than in cells	into the cells
B	higher than in cells	out of the cells
C	lower than in cells	into the cells
D	lower than in cells	out of the cells

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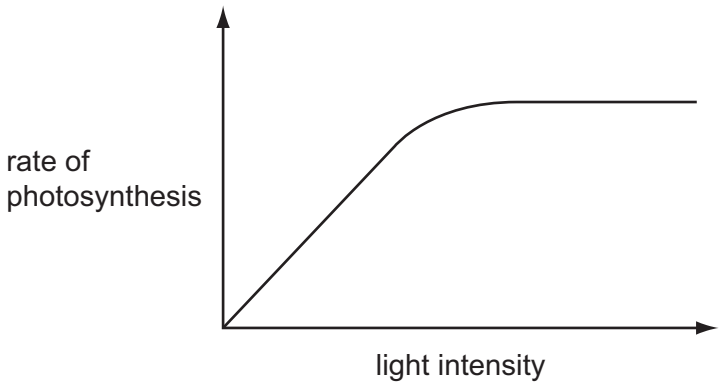
3 The graph shows the effect of light intensity on the rate of photosynthesis when other factors are kept constant.



Which statement could explain what is happening at higher light intensities?

A All the available chloroplasts are fully occupied in light absorption.

B The chlorophyll in the chloroplasts has been damaged.

C Glucose is inhibiting photosynthesis.

D The temperature is too high for photosynthesis.

4 By what process is food pushed along the small intestine?

A assimilation

B digestion

C excretion

D peristalsis

5 Which adaptations of a root hair cell make it suitable for water uptake?

	partially permeable cell membrane	surface area to volume ratio of the cell
A	absent	high
B	absent	low
C	present	high
D	present	low

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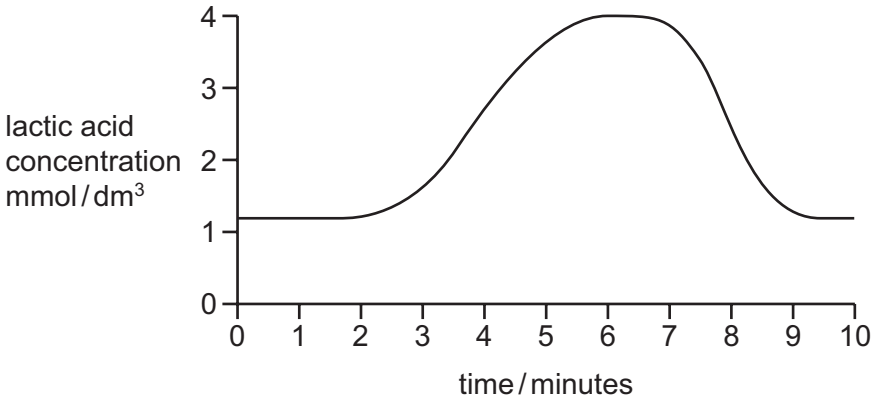
6 What happens to the valves in the heart when blood is being pumped to the lungs?

	bicuspid (mitral)	semi-lunar	tricuspid
A	closed	closed	open
B	closed	open	closed
C	open	closed	closed
D	open	open	open

7 The graph shows changes in the concentration of lactic acid in the muscles of an athlete both during and after a race.



When did the athlete finish the race?

A 1 minute

B 3 minutes

C 7 minutes

D 10 minutes

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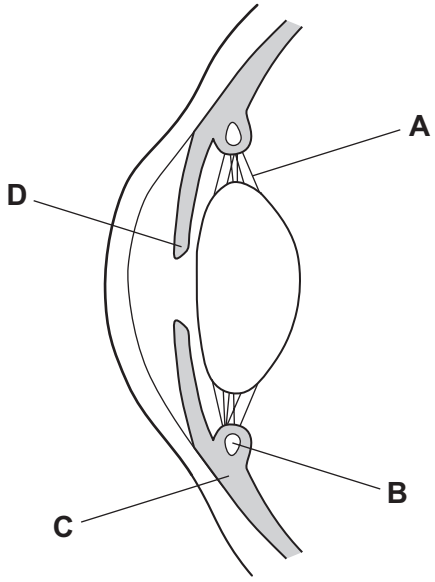
8 The diagram shows a section through part of a human eye.

Which structure contains the muscles which contract to control pupil size?



9 What are the effects of alcohol and heroin on the body?

	alcohol	heroin
A	depressant	depressant
B	depressant	stimulant
C	stimulant	depressant
D	stimulant	stimulant

10 Which statement is **not** correct?

A A producer can have more than one consumer.

B Energy flowing through biological systems is recycled.

C Food chains show energy flow in ecosystems.

D The Sun is the principal source of energy input into biological systems.

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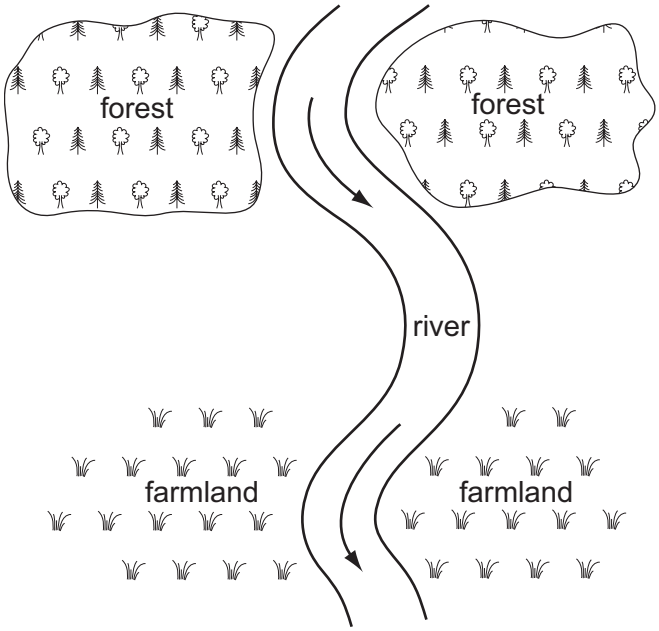
11 The diagram represents a forest and farmland on either side of a river.



The forest is cut down.

Which row shows a result of cutting down the forest and a likely effect of this on the farmland?

	result of cutting down the forest	effect on the farmland
A	less carbon dioxide	higher temperatures
B	more light falling on river	more nitrates reaching the soil
C	drought	water logging
D	water running off cleared area	flooding

12 What is a reason for breast milk being better for a baby than bottled milk?

A It contains antibodies for disease protection.

B It contains calcium ions for bone development.

C It contains protein for growth.

D It contains sugar for energy.

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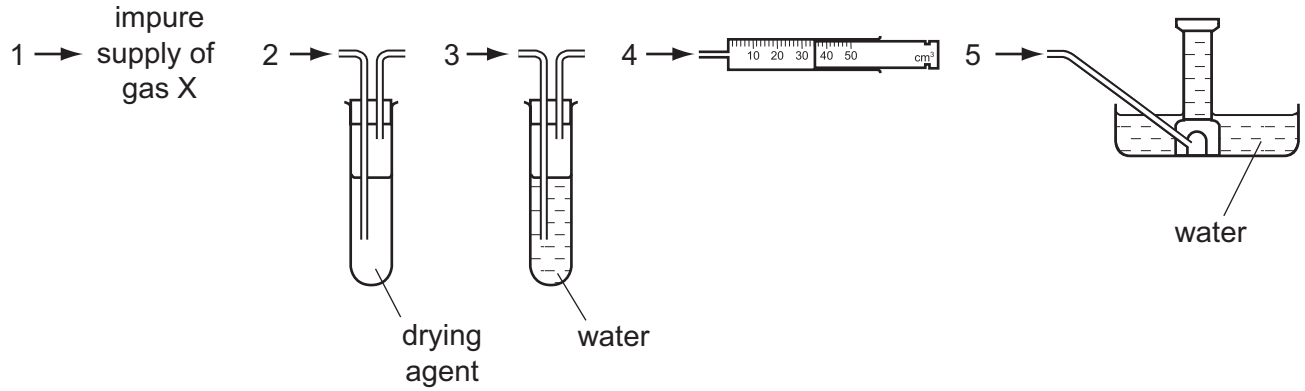
13 What is true for syphilis?

	first symptoms develop after	treatment
A	14-21 days	antibiotics
B	14-21 days	vaccine
C	number of years	antibiotics
D	number of years	vaccine

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

An impure supply of X contains water vapour and a water-soluble impurity.



In which order should pieces of apparatus be joined together to collect a pure, dry sample of X?

A 1, 2, 3, 4 **B** 1, 2, 3, 5 **C** 1, 3, 2, 5 **D** 1, 3, 2, 4

15 Two atoms are isotopes of an element because they have

A the same number of electrons and neutrons.

B the same number of neutrons and a different number of protons.

C the same number of protons and a different number of neutrons.

D the same number of protons and neutrons.

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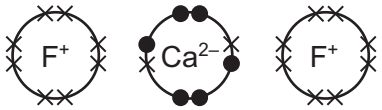
16 Which diagram shows the electron arrangement in calcium fluoride?

Only the outer shell electrons are shown.

A

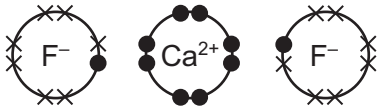


key

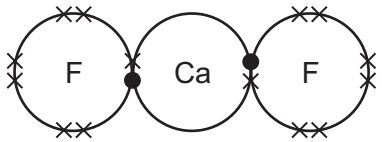
● = electrons from calcium

× = electrons from fluorine

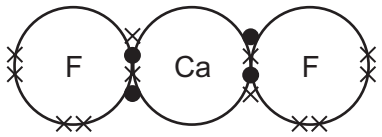
B



C



D

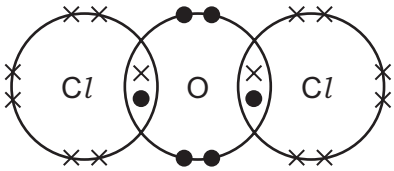


17 An atom of chlorine has seven outer electrons.

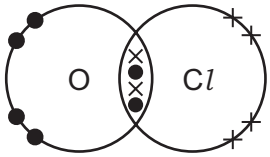
An atom of oxygen has six outer electrons.

Which dot and cross diagram for a compound of oxygen and chlorine is correct?

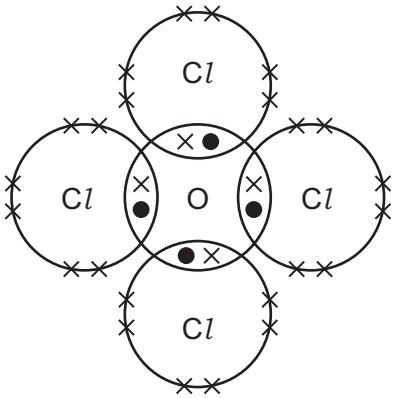
A



B



C



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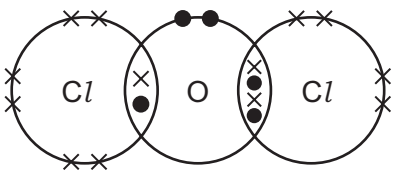

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18 Sodium hydroxide, NaOH, and sulfuric acid, H_2SO_4, react together in a neutralisation reaction.

What is the balanced equation for this reaction?

A $NaOH + H_2SO_4 \rightarrow NaSO_4 + H_2O$

B $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$

C $2NaOH + H_2SO_4 \rightarrow NaSO_4 + H_2O$

D $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

19 Which equation represents a neutralisation reaction?

A $H^{2+}(aq) + OH^-(aq) \rightarrow H_2O(l)$

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

C $2H^+(aq) + O^{2-}(aq) \rightarrow H^2O(l)$

D $2H^+(aq) + O^-(aq) \rightarrow H_2O(l)$

20 The elements in one group of the Periodic Table show the following trends.

- The element with the smallest atom has the greatest reactivity.
- The colour of the elements gets darker down the group.
- The elements at the top of the group are gases at room temperature.

In which group are the elements found?

A Group I

B Group II

C Group VI

D Group VII

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21 P, Q, R and S are four different substances.

- P is a grey solid with a melting point of 420 °C and is a good conductor of electricity.
- Q is a black solid with covalent bonding and is a good conductor of electricity.
- R is a black solid with melting point 1327 °C and it only conducts electricity when melted.
- S is a ductile solid with a melting point of 1064 °C and it is used in electrical connectors.

Which statement is correct?

A P and Q are both non-metals.

B P and S are both metals.

C Q and R are both metals.

D R and S are both metals.

22 Metal X reacts with the oxide of metal Y, but not with the oxide of metal Z.

What is the order of reactivity of the metals X, Y and Z?

	most reactive ⟶ least reactive		
A	X	Z	Y
B	Y	X	Z
C	Z	X	Y
D	Z	Y	X

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23 The gases making up dry air can be separated by fractional distillation of liquid air.

The boiling points of five of the gases in dry air are given below.

gas	boiling point / °C
N_2	–210
O_2	–220
Ar	–186
Ne	–246
Kr	–152

In the fractional distillation of liquid air, which gas will distil off first and which gas will distil off last?

	first	last
A	N_2	O_2
B	O_2	Ne
C	Ar	N_2
D	Ne	Kr

24 Ammonia gas is produced when solid ammonium chloride is heated with

A calcium hydroxide.

B calcium sulfate.

C hydrochloric acid.

D magnesium nitrate.

25 Which statement about the homologous series of alkanes is correct?

A Alkanes have double bonds between carbon atoms.

B Alkanes have the general formula C_nH_{2n+1}

C As the number of carbon atoms in the alkanes increases they become more flammable.

D The boiling point of the alkanes increases as the length of the carbon chain increases.

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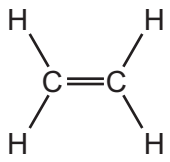
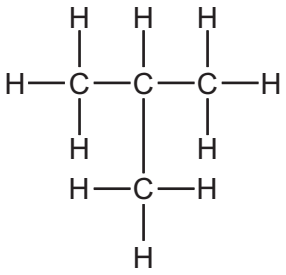
26 Which compound can form an addition polymer?

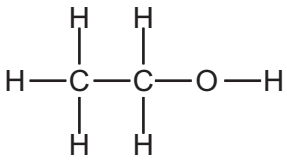
A



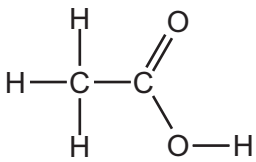
B



C

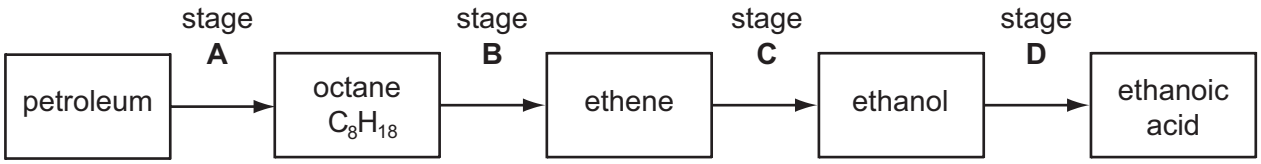


D



27 The diagram shows four stages in a reaction scheme.

Which stage involves an addition reaction?



28 Which instrument is used to measure the volume of an irregularly shaped object?

A a measuring cylinder

B a metre rule

C a micrometer

D vernier calipers

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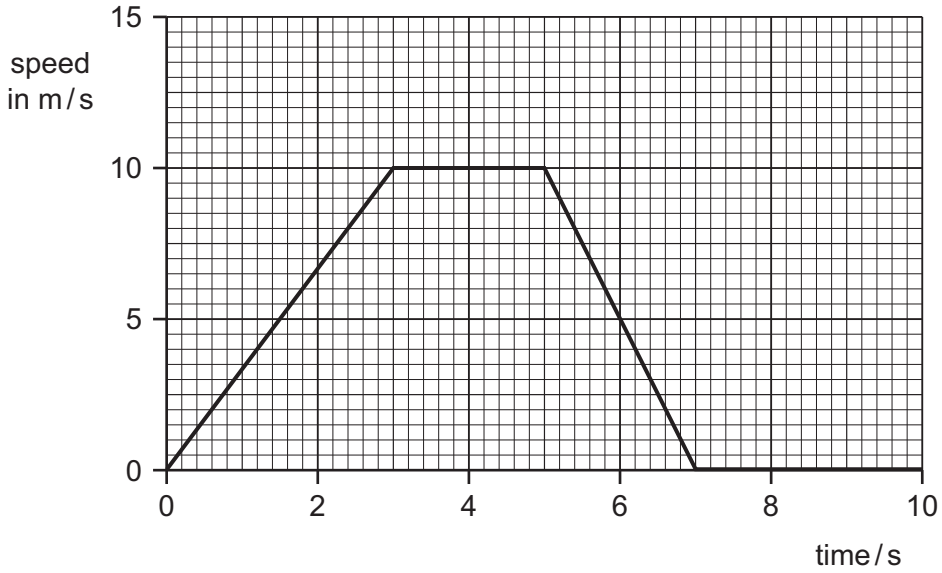
29 The graph shows the speed of a car over the first ten seconds of a journey.



Which statement about the acceleration of the car between 3 s and 5 s is true?

A The acceleration decreases.

B The acceleration increases.

C The acceleration is zero.

D The acceleration is 10 m / s.

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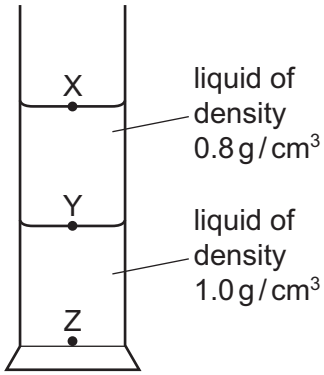
30 Two liquids form separate layers in a measuring cylinder. The two liquids cannot be mixed. The upper liquid has a density of $0.8\,g/cm^3$ and the lower liquid has a density of $1.0\,g/cm^3$.

A cube of material has a mass of 20 g. The length of each side of the cube is 2 cm. The cube is carefully lowered into the measuring cylinder.



What is the density of the cube material and the final position of the cube in the measuring cylinder?

	density g/cm^3	final position
A	0.4	X
B	0.4	Y
C	2.5	Y
D	2.5	Z

31 A solar cell is connected to a battery.

The solar cell charges the battery.

What are the main energy changes?

A light to chemical to electrical

B light to electrical to chemical

C kinetic to chemical to electrical

D kinetic to electrical to chemical

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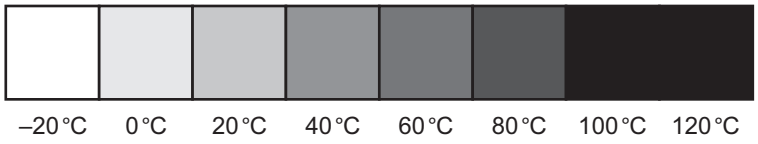
32 The colour of a certain group of materials changes from white to black passing through different shades of grey as their temperature increases. This property can be used to create a thermometer.

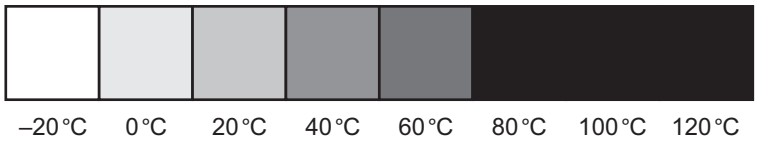
The diagrams show how the shade of grey in four such thermometers changes with temperature.

Which thermometer has the greatest range?

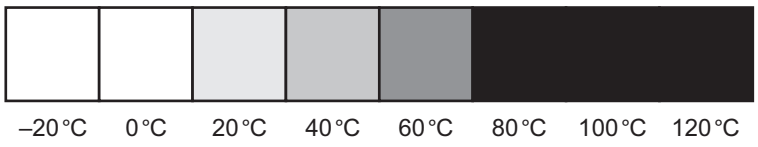
A



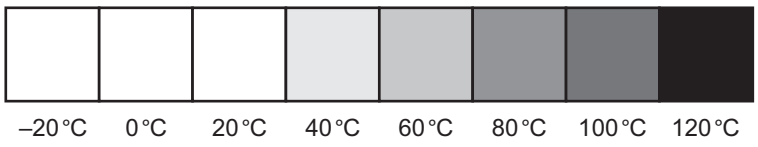
B



C



D



33 A wave has a frequency of 30 000 Hz and a speed of 1500 m / s.

What is the wavelength?

A 0.05 m **B** 0.50 m **C** 20 m **D** 200 m

34 Which of the following has the longest wavelength?

A microwaves

B radio waves

C visible light

D X-rays

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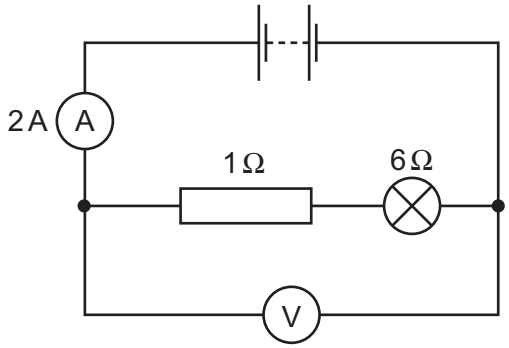
35 A series circuit consists of a battery, an ammeter, a lamp and a resistor. A voltmeter is placed across the lamp and the resistor.



What is the voltmeter reading?

A 2 V **B** 10 V **C** 12 V **D** 14 V

36 A 2 kW appliance is to be connected to a 240 V supply.

Which fuse should be fitted in the plug?

A 1 A **B** 3 A **C** 5 A **D** 10 A

37 Which line in the table correctly shows examples of transverse and longitudinal waves?

	transverse	longitudinal
A	gamma-rays	sound
B	infra-red	water waves
C	radio	light
D	sound	X-rays

38 What is an example of induced magnetism?

A a compass needle pointing north

B a north pole attracting iron filings

C a north pole repelling a north pole

D a negatively charged balloon attracting small pieces of paper

39 What is the nucleon number of a nuclide?

A the number of neutrons

B the number of protons

C the total number of neutrons and protons

D the total number of protons and electrons

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40 The radioactive decay of a nuclide is represented by the equation below.

$$^{234}_{90}\text{Th} \rightarrow {}^{234}_{91}\text{Pa} + \text{emitted particle}$$

Which type of particle is emitted during the decay shown?

A alpha-particle

B beta-particle

C neutron

D proton

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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 †																

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

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

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