Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/11**

Paper 1 Multiple Choice **May/June 2016**

45 minutes

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.

1 What are characteristics of all living organisms?

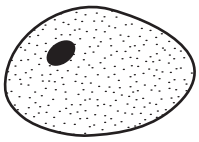
A breathing, photosynthesis and transpiration

B circulation, excretion and nutrition

C digestion, growth and movement

D respiration, reproduction and sensitivity

2 The diagram shows an animal cell. The maximum diameter of the diagram is 25 mm.



The maximum diameter of the actual cell was 0.02 mm.

What is the magnification of the drawing?

A ×25 **B** ×200 **C** ×1250 **D** ×2500

3 Which statement about diffusion of water is **not** correct?

A Diffusion of water takes place only in liquids.

B Diffusion of water relies on the random movement of the water molecules.

C Water molecules are small enough to diffuse through cell membranes.

D Water molecules are small enough to diffuse through cell walls.

4 What describes an enzyme?

A a protein that acts as a catalyst

B a protein that acts as a hormone

C a vitamin that acts as a catalyst

D a vitamin that acts as a hormone

5 Which part of a leaf contains the pigment needed for photosynthesis?

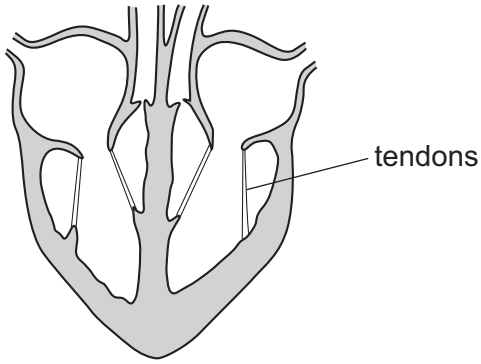
A cuticle

B mesophyll cells

C phloem cells

D stomata

6 The diagram shows a section through the human heart.



Which structures are joined by the tendons?

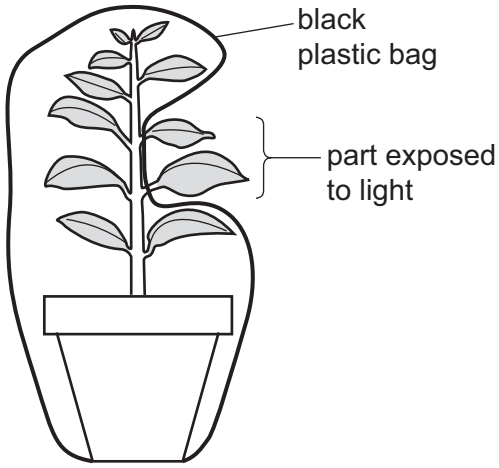
A atrium wall and septum

B atrium wall and valve

C septum and ventricle wall

D valve and ventricle wall

7 The diagram shows a green plant. Most of the plant is enclosed in a black plastic bag. Only one part is exposed to the light and can photosynthesise.



How is the sugar, produced by the exposed part, transported to the rest of the plant?

A in the phloem, downwards only

B in the xylem, upwards only

C upwards and downwards in the phloem

D upwards and downwards in the xylem

8 What is the purpose of respiration?

A to enrich the atmosphere with oxygen

B to release energy for the organism

C to supply water for the organism

D to take oxygen into the lungs

9 Where does most of the oxygen enter the blood?

A an alveolus

B a bronchiole

C a bronchus

D the trachea

10 Four people have the same resting pulse rate and the same blood glucose concentration. The table shows their pulse rates and blood glucose concentrations later on the same day.

Which person has the highest concentration of adrenaline in their blood?

	pulse rate / beats per minute	blood glucose concentration / mg per dm^3
A	70	65
B	70	100
C	120	65
D	120	100

11 Which statement about sexual reproduction is **always** correct?

A It involves only one parent.

B It involves the fusion of nuclei.

C It produces genetically identical offspring.

D It takes place only in animals.

12 A woman with a regular 28 day menstrual cycle has a blocked right oviduct. An egg is released from the right ovary.

When is the next time that sexual intercourse is **most** likely to result in fertilisation?

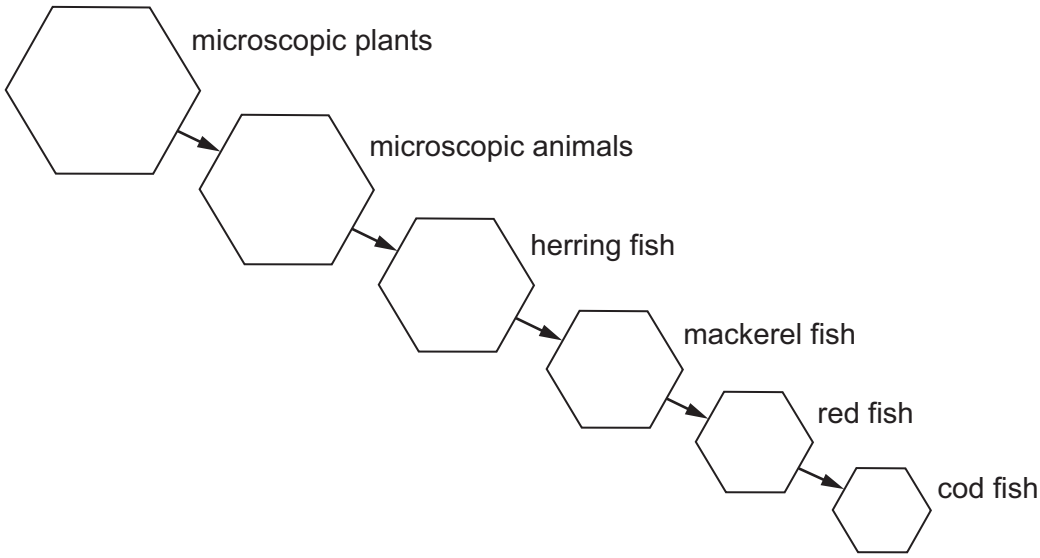
A immediately

B one week later

C 5 days after the beginning of the next menstruation

D 14 days after the beginning of the next menstruation

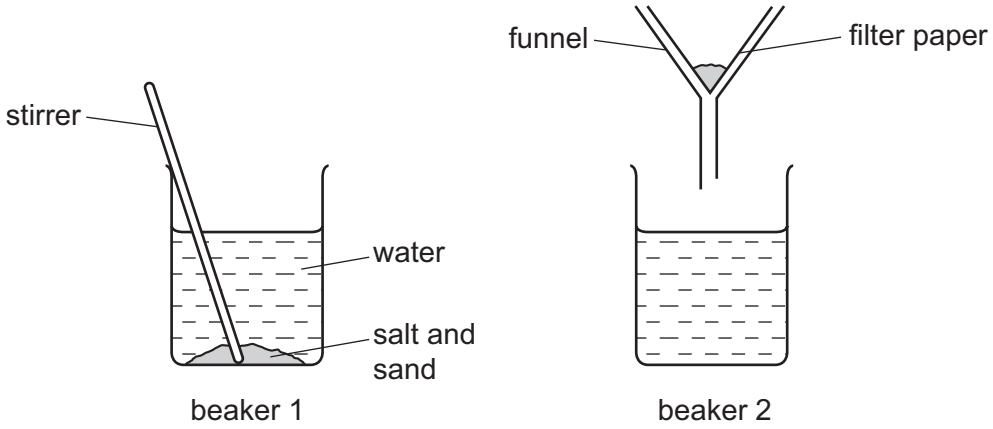
13 The diagram represents a food chain found in the sea.



How many consumer levels are there?

A 1 **B** 4 **C** 5 **D** 6

14 The apparatus used to remove sand from a mixture of salt and sand is shown.



The contents of beaker 1 are stirred and then poured into the funnel above beaker 2.

What is in beaker 2?

A a mixture of an element and a compound

B a mixture of two compounds

C one compound only

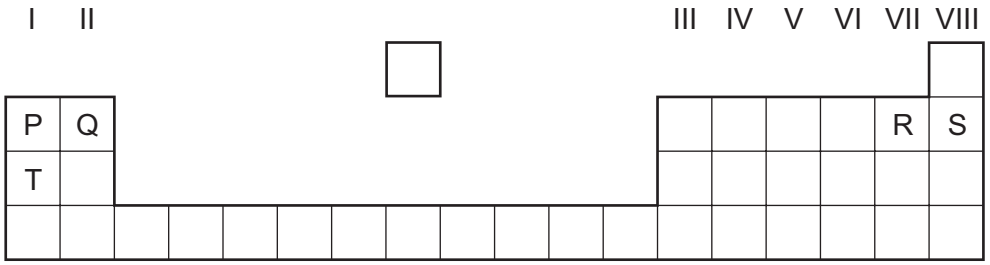
D one element only

15 Which types of substance do the chemical symbols C, CO_2 and O_2 represent?

	C	CO_2	O_2
A	compound	compound	element
B	compound	element	compound
C	element	compound	element
D	element	element	compound

16 The positions of elements P, Q, R, S and T in the Periodic Table are shown.

The letters are **not** the symbols for the elements.

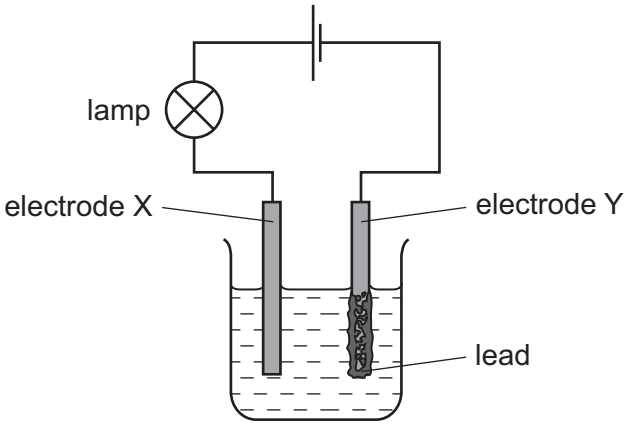


Which element forms an ionic compound with element P?

A Q **B** R **C** S **D** T

17 The diagram shows the apparatus used for the electrolysis of lead(II) bromide using inert electrodes X and Y.

Lead is formed at electrode Y.



Which statement about the electrolysis is correct?

A A green gas is given off at electrode X.

B Electrode Y is the anode.

C Only a physical change takes place when a current is passed.

D The electrolyte is in the molten state.

18 What happens during **all** endothermic changes?

A A gas is produced.

B Solids melt.

C The temperature decreases.

D There is a colour change.

19 Which statement describes a redox reaction?

A An acid reacts with a base.

B Only oxidation takes place.

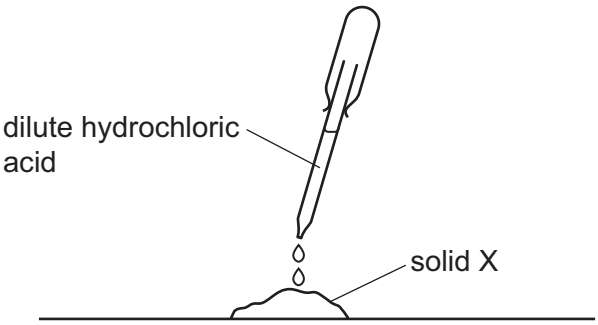
C Oxygen is transferred from one substance to another.

D Two substances are both reduced.

[Turn over

20 Dilute hydrochloric acid is added to solid X.

Hydrogen gas is produced.



What is X?

A zinc

B zinc carbonate

C zinc hydroxide

D zinc oxide

21 Which test is used to identify ammonia?

A A glowing splint relights.

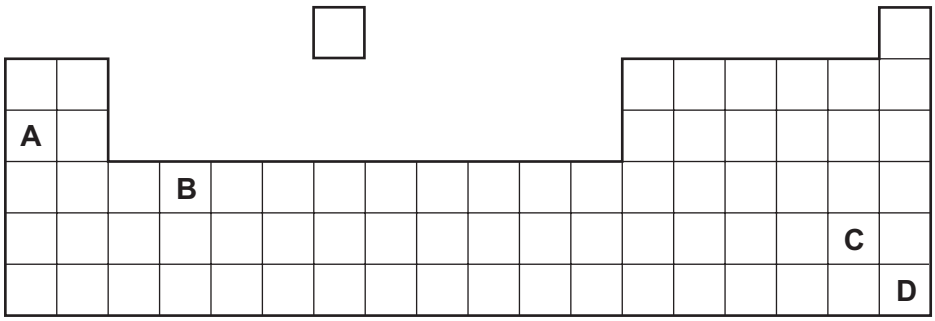
B Damp blue litmus paper is bleached.

C Damp red litmus paper turns blue.

D Limewater turns milky.

22 A soft metal reacts vigorously with cold water.

What is the position of this metal in the Periodic Table?



23 Which statement describes a transition element?

A a metal that forms white compounds

B a metal with a high melting point

C a metal with a low density

D a non-metal that forms coloured compounds

24 P, Q, R and S are four metals.

P forms bubbles of gas with dilute acid but does not react with cold water.

Q reacts slowly with cold water.

R does not react with dilute acid.

S reacts rapidly with cold water.

What is the order of reactivity from most to least reactive?

A R → P → Q → S

B R → Q → P → S

C S → P → Q → R

D S → Q → P → R

25 A colourless liquid is tested with blue cobalt chloride paper.

The paper turns pink.

Which statement about the liquid **must** be correct?

A It contains water.

B It is acidic.

C It is anhydrous.

D It is pure water.

26 Which reaction involves combustion?

A calcium carbonate → calcium oxide + carbon dioxide

B methane + oxygen → carbon dioxide + water

C sodium carbonate + hydrochloric acid → sodium chloride + water + carbon dioxide

D sodium hydroxide + hydrochloric acid → sodium chloride + water

[Turn over

27 What is the name of the type of compound containing only carbon and hydrogen?

A carbohydrate

B carbonate

C hydrocarbon

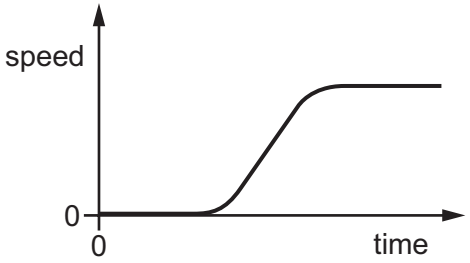
D hydroxide

28 A train takes passengers from a railway station to an airport.

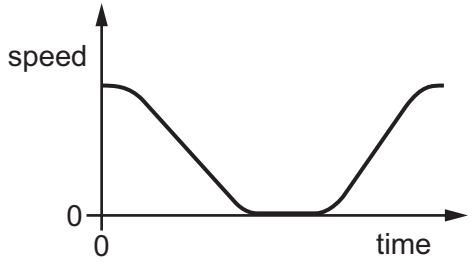
The train accelerates as it leaves the railway station, then travels at a steady speed, and finally stops at the airport.

Which graph shows the speed of the train during the whole journey?

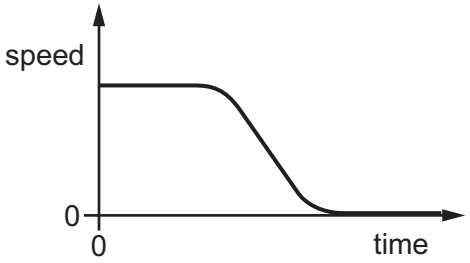
A



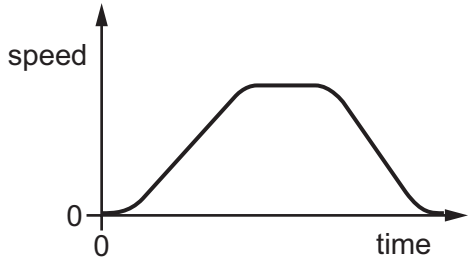
B



C



D



29 A cube of metal has a mass of 2700 g and a density of 2.7 g / cm^3.

What is the length of each side of the cube?

A 1.0 cm **B** 10 cm **C** 100 cm **D** 1000 cm

30 The Sun is the original source of many of our energy resources.

For which energy resource is the Sun **not** the original source?

A hydroelectric

B natural gas

C nuclear

D waves

31 When a liquid evaporates, molecules escape from its surface and the temperature of the remaining liquid changes.

Which row is correct for the escaping molecules and for the temperature change of the remaining liquid?

	the molecules escaping from the surface have	the temperature of the remaining liquid
A	the highest energy	decreases
B	the highest energy	increases
C	the lowest energy	decreases
D	the lowest energy	increases

32 Benzene and glycerine are two substances.

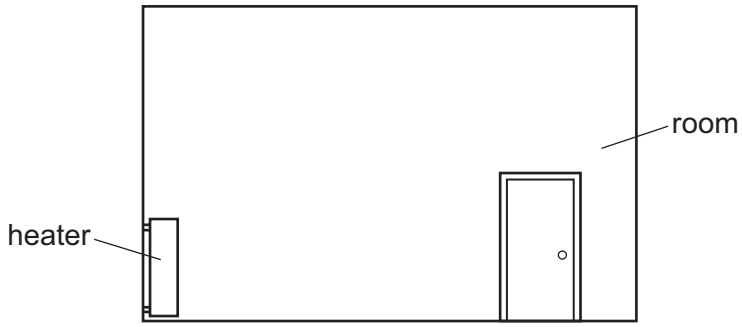
The table gives the melting point and the boiling point of benzene and of glycerine.

	melting point / °C	boiling point / °C
benzene	5.4	80
glycerine	18	290

At which temperature are both benzene and glycerine liquid?

A 0 °C **B** 50 °C **C** 90 °C **D** 300 °C

33 The diagram shows a heater in a room.



What happens to the air as it is heated by the heater?

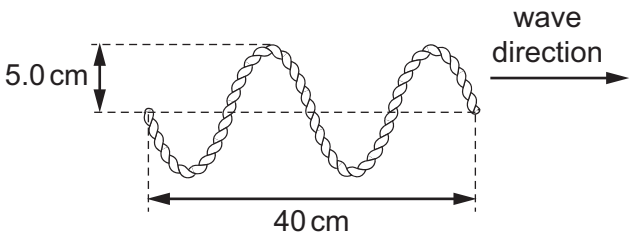
A Its density decreases and it falls.

B Its density decreases and it rises.

C Its density increases and it falls.

D Its density increases and it rises.

34 A student vibrates the end of a horizontal rope and sends a wave along the rope. The wave is shown in the diagram.

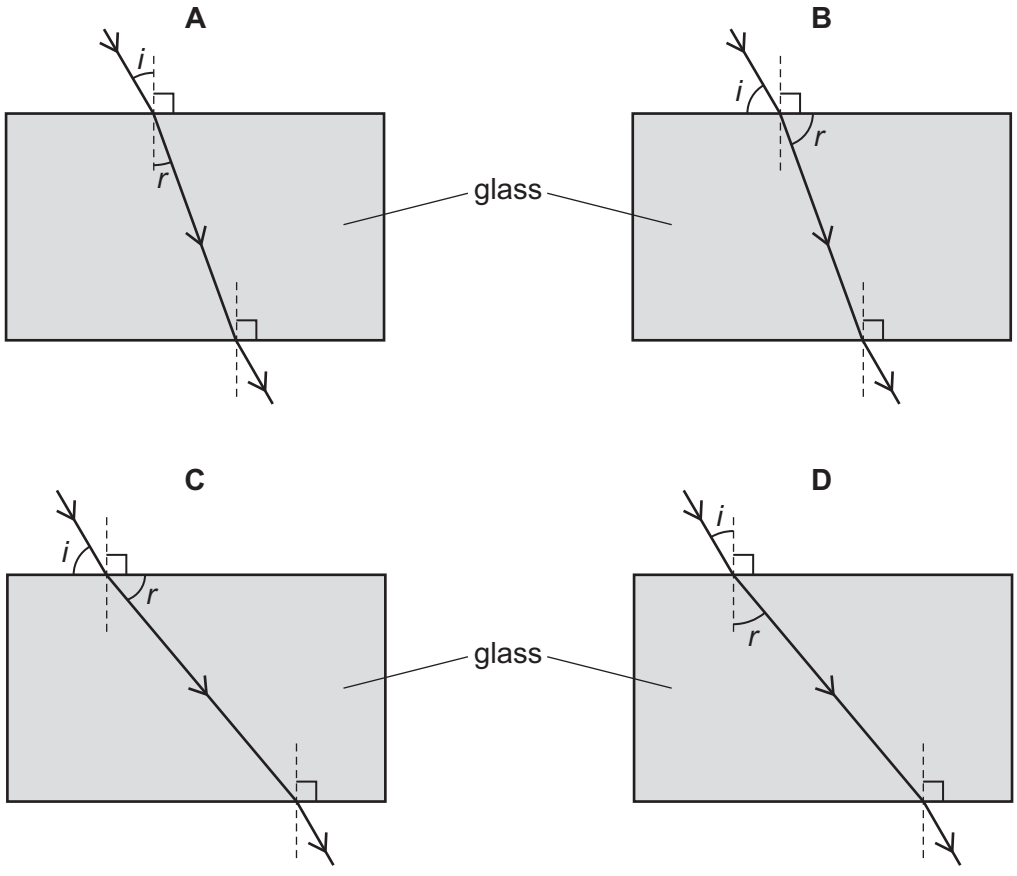


What is the amplitude of the wave, and what is the wavelength of the wave?

	amplitude / cm	wavelength / cm
A	5.0	10
B	5.0	20
C	10	10
D	10	20

35 A ray of light passes from air into a rectangular glass block and back into the air again.

Which diagram shows the path of the light, the angle of incidence labelled *i* and the angle of refraction labelled *r*?



36 Which type of wave is used by television remote controllers?

A infra-red

B microwaves

C radio

D ultraviolet

37 A student determines the speed of sound in air. She measures the time between making a sound and hearing the echo from a cliff.

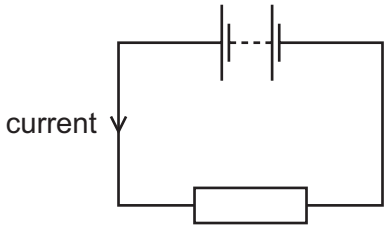
She uses the equation: speed = $\frac{\text{distance}}{\text{time}}$.

Which type of sound does she make and which distance does she use in her calculation?

	type of sound	distance used
A	continuous sound	2 × distance to cliff
B	continuous sound	$\frac{1}{2}$ × distance to cliff
C	short, sharp sound	2 × distance to cliff
D	short, sharp sound	$\frac{1}{2}$ × distance to cliff

[Turn over

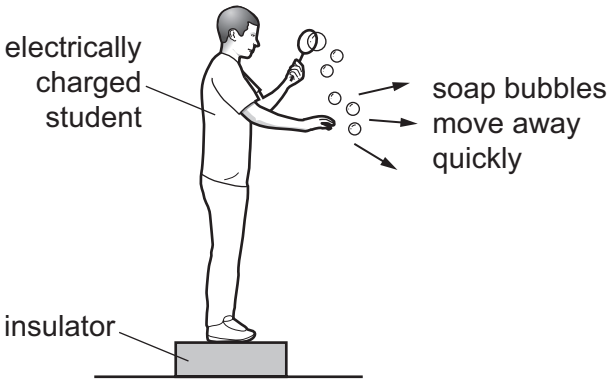
38 A battery is connected to a resistor.



Which changes to the resistance of the resistor, and to the potential difference across the resistor, **must** produce a smaller current?

	resistance	potential difference
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

39 An electrically charged student produces soap bubbles. When he holds his hand near the bubbles, they move away quickly from his hand.



For this movement of the bubbles to happen, which statement is correct?

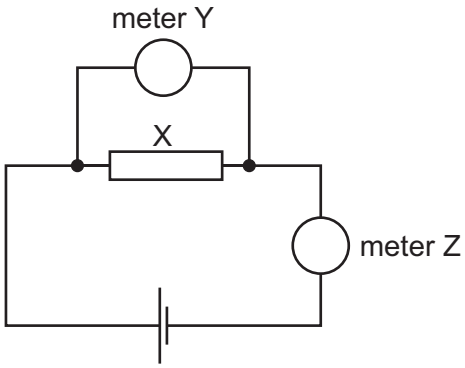
A The bubbles must be negatively charged.

B The bubbles must be positively charged.

C The bubbles must have the opposite charge to the charge on the student.

D The bubbles must have the same charge as the charge on the student.

40 The circuit shown contains a component X and two meters Y and Z.



Which unit is used when stating the value of X, and which units are used when stating the readings on Y and Z?

	X	Y	Z
A	amp	ohm	volt
B	amp	volt	ohm
C	ohm	amp	volt
D	ohm	volt	amp

The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

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