

COMBINED SCIENCE

5129/11

Paper 1 Multiple Choice

October/November 2015

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.

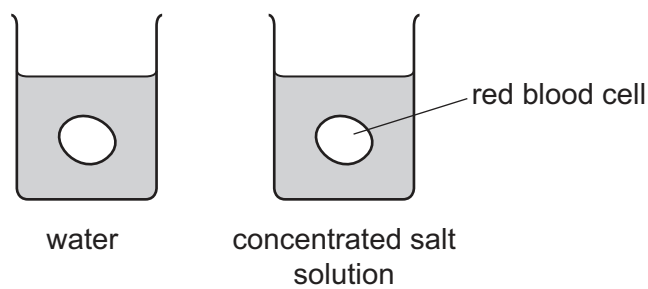
Electronic calculators may be used.

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

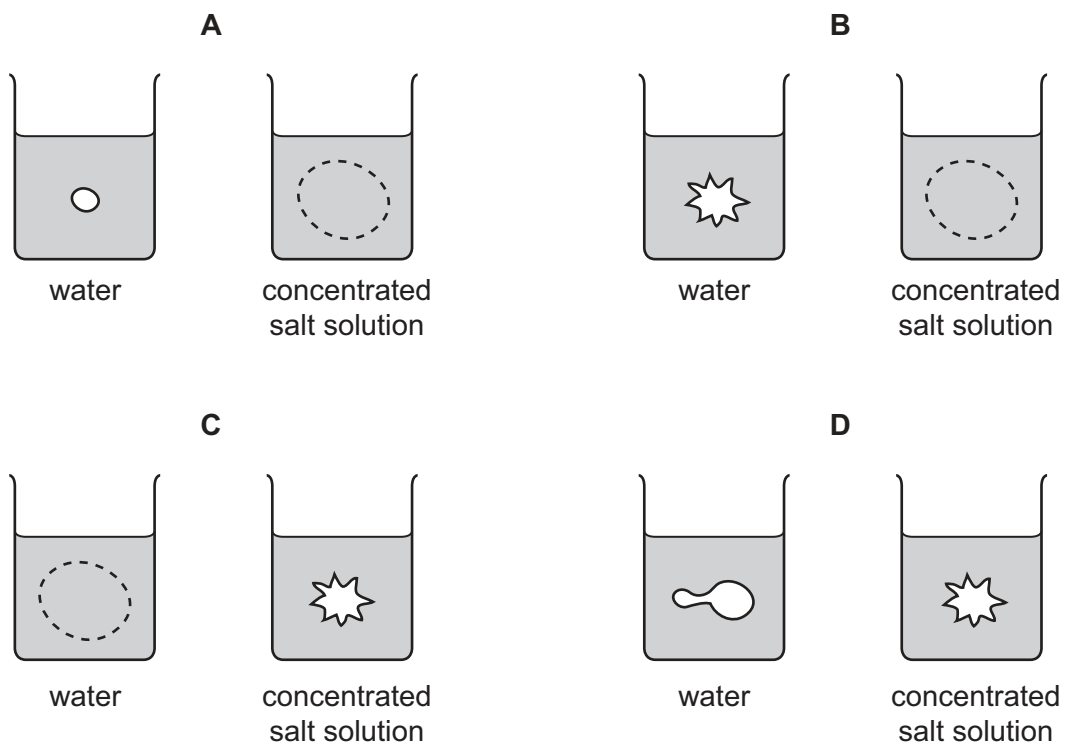
- 1 Which pair of statements best explains why plant cells are more angular in shape than animal cells?

	plant cells	animal cells
A	cell wall present	cell wall absent
B	chloroplast present	chloroplast absent
C	one or more large vacuoles	small or no vacuoles
D	thin layer of cytoplasm	dense cytoplasm throughout cell

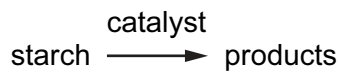
- 2 One beaker contains water. Another beaker contains a concentrated salt solution. A red blood cell is placed into each beaker.



Which diagram shows the appearance of the cells after 5 minutes?



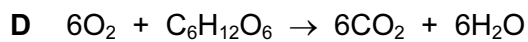
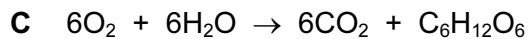
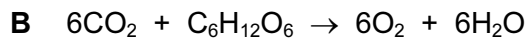
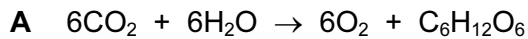
- 3 The following reaction occurs in the human alimentary canal.



What is the catalyst and what is one of the products?

	catalyst	product
A	acid	glucose
B	acid	maltose
C	amylase	glucose
D	amylase	maltose

- 4 Which is the equation for photosynthesis?



- 5 Scientists observe that the adult skulls of Roman soldiers from 2000 years ago had perfect teeth.

This is most likely to be because in Roman times, compared to now, they had

A a diet containing fewer minerals.

B a diet containing less sugar.

C a diet containing more fat.

D a diet containing more protein.

- 6 What is lost from the stomata during transpiration?

A carbon dioxide

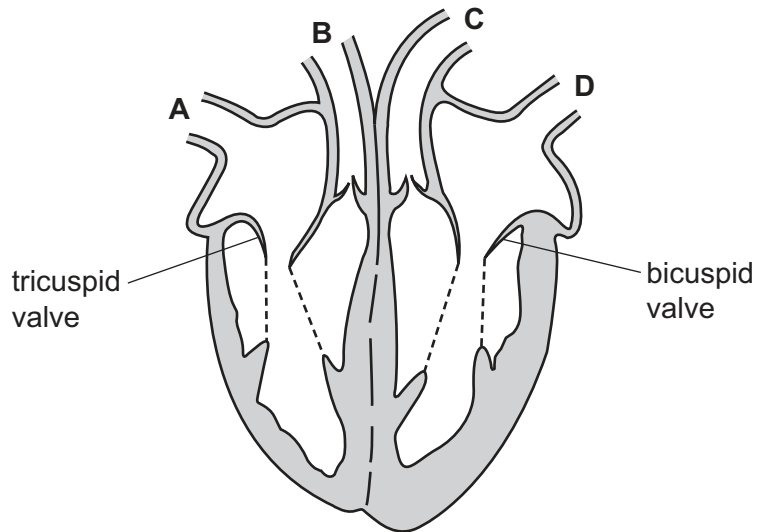
B nitrogen

C oxygen

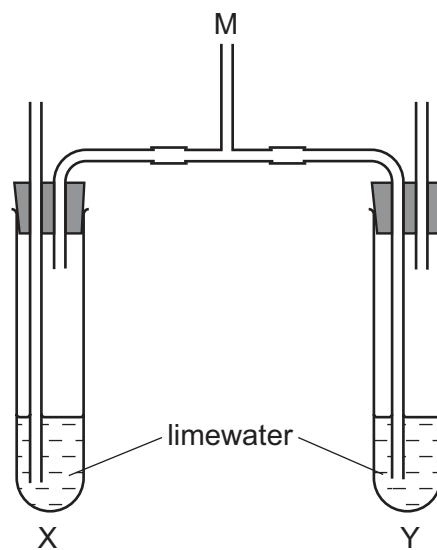
D water vapour

7 The diagram shows the heart.

Which vessel is an artery carrying deoxygenated blood?



8 The apparatus shown is used to investigate gas exchange during breathing.



Which describes the appearance of solutions X and Y after a person has exhaled several times through tube M?

	solution X	solution Y
A	clear	clear
B	clear	cloudy
C	cloudy	clear
D	cloudy	cloudy

9 Where in the body are amino acids converted to urea and through which organ is urea excreted?

	amino acids converted to urea	urea excreted
A	kidney	liver
B	kidney	stomach
C	liver	kidney
D	liver	stomach

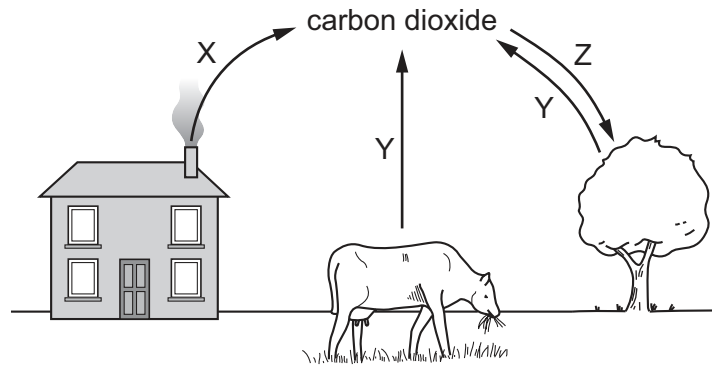
10 Which group of chemicals are produced in human glands to have an effect on target organs?

- A** enzymes
- B** hormones
- C** proteins
- D** vitamins

11 Which row shows possible effects of the drug heroin?

	breathing rate	speed of nerve impulses
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

12 The diagram shows part of the carbon cycle.



Which row describes processes X, Y and Z?

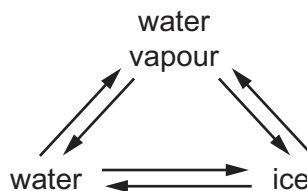
	X	Y	Z
A	combustion	photosynthesis	respiration
B	combustion	respiration	photosynthesis
C	photosynthesis	respiration	combustion
D	respiration	combustion	photosynthesis

13 AIDS (Acquired Immune Deficiency Syndrome) is a serious disease caused by the Human Immunodeficiency Virus (HIV).

Which interaction between people could transmit the virus?

- A** being close to an infected person who sneezes
- B** eating a meal with an infected person
- C** having unprotected sexual intercourse with an infected person
- D** kissing an infected person

14 In which conversion do water molecules lose speed?



- A** ice → water
- B** ice → water vapour
- C** water vapour → ice
- D** water → water vapour

15 Which row shows an atom containing 24 neutrons?

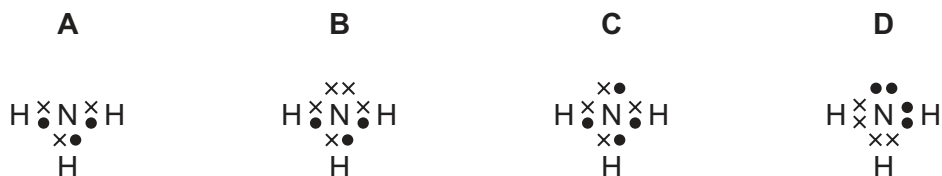
	proton number	nucleon number
A	8	16
B	12	24
C	21	45
D	24	52

16 Magnesium metal reacts with chlorine to produce magnesium chloride, an ionic compound.

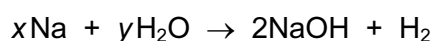
Which statement describes what happens to the atoms during the reaction?

- A** A magnesium atom gains two electrons and a chlorine atom loses two electrons.
B A magnesium atom gains two electrons and two chlorine atoms each lose one electron.
C A magnesium atom loses two electrons and a chlorine atom gains two electrons.
D A magnesium atom loses two electrons and two chlorine atoms each gain one electron.

17 Which 'dot and cross' diagram for ammonia, NH_3 , is correct?



18 The equation shows the reaction between sodium and water.



What are the values of x and y for the equation to be balanced?

	x	y
A	1	1
B	1	2
C	2	1
D	2	2

- 19** A spatula measure of compound Z is stirred into a beaker containing some dilute hydrochloric acid.

Another spatula measure of Z is stirred into a beaker of aqueous sodium hydroxide.

In both experiments, Z dissolves and a neutral solution is made.

What is Z?

- A** a basic oxide
 - B** a carbonate
 - C** an acidic oxide
 - D** an amphoteric oxide
- 20** Which statement describes the elements in Group VII of the Periodic Table?
- A** They are diatomic molecules which get more reactive descending the group.
 - B** They are diatomic molecules whose melting points increase descending the group.
 - C** They are soft metals with low melting points.
 - D** They are unreactive gases used in lamps and balloons.
- 21** Steel objects are often galvanised to prevent rusting.

Galvanising involves coating the object by dipping it in a molten metal.

Which metal is used?

- A** chromium
- B** lead
- C** tin
- D** zinc

22 Q, R, S and T are four metals.

T reacts slowly with hydrochloric acid.

Q does not react with acid.

R reacts with steam but not with cold water.

S reacts violently with cold water.

What is the order of reactivity of the four metals, most reactive first?

A Q → T → R → S

B Q → R → T → S

C S → Q → R → T

D S → R → T → Q

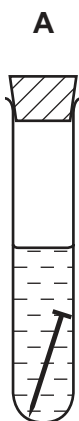
23 A number of different reactions produce hydrogen gas.

Which pair of reactions both produce hydrogen?

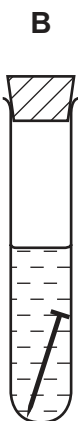
	reaction 1	reaction 2
A	a metal and an acid	a reactive metal and water
B	a reactive metal and water	an acid and an alkali
C	an acid and a carbonate	a metal and an acid
D	an acid and alkali	an acid and a carbonate

24 The diagrams show an investigation into the rusting of iron.

Which nail would you expect to have the least amount of rusting after one week?



stoppered test-tube
nail completely
submerged
in tap water



stoppered test-tube
nail completely
submerged in
boiled tap water



open test-tube
nail half submerged
in tap water



open test-tube
nail completely
submerged in
boiled tap water

25 The molecular formulae of four organic compounds, W, X, Y and Z, are shown.

W	X	Y	Z
C_4H_8	C_3H_8	C_3H_6	C_4H_{10}

Which statement is correct?

- A W and Y have the same general formula.
- B W and Z have the same general formula.
- C X and Y belong to the same homologous series.
- D Y and Z belong to the same homologous series.

26 The fractions obtained from the fractional distillation of petroleum have different boiling point ranges.

Four of the fractions are known as kerosene, diesel, gasoline and bitumen.

Which fraction is correctly matched to its boiling range?

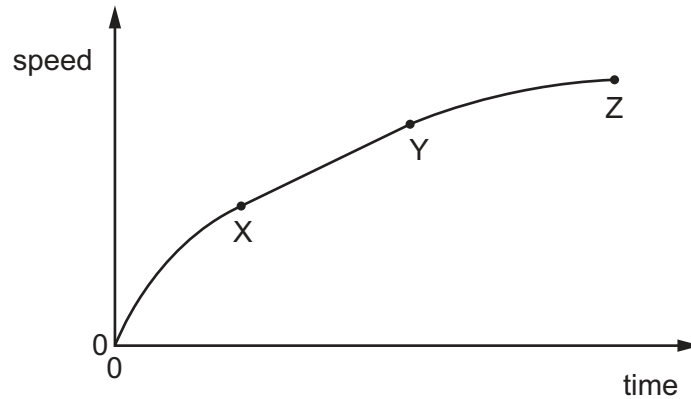
	fraction	boiling point range
A	bitumen	greater than $350\text{ }^\circ\text{C}$
B	diesel	$150\text{ }^\circ\text{C}$ to $220\text{ }^\circ\text{C}$
C	gasoline	$220\text{ }^\circ\text{C}$ to $350\text{ }^\circ\text{C}$
D	kerosene	$30\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$

27 Alkenes are a series of unsaturated hydrocarbons containing a double bond.

Which formula does **not** represent an alkene?

- A C_2H_4
- B C_3H_6
- C C_4H_{10}
- D C_6H_{12}

28 The speed of a car moving along a straight road varies with time as shown.

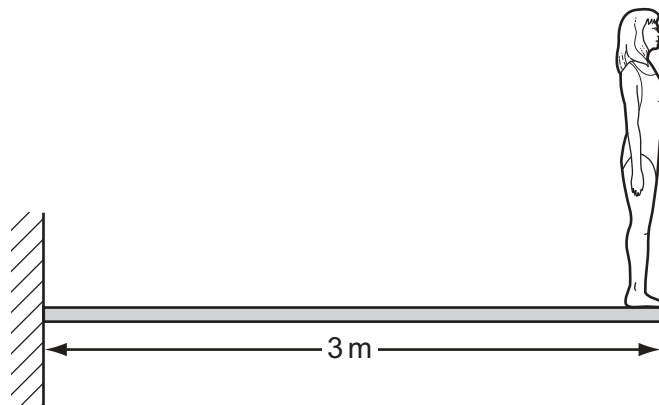


Which statement is correct?

- A Between X and Y the acceleration is constant.
 - B Between X and Y the speed is constant.
 - C Between Y and Z the car is slowing down.
 - D Between 0 and X the acceleration is constant.
- 29 An object is taken from the Earth to the Moon. The gravitational field strength on the Moon is less than the gravitational field strength on the Earth.

Which statement is correct?

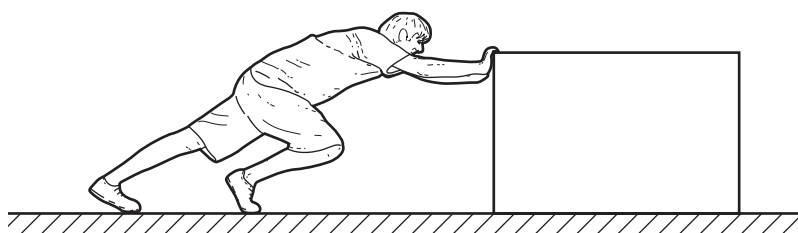
- A Both the mass and the weight of the object decrease.
 - B The object's mass and weight both stay the same.
 - C The object's mass decreases.
 - D The object's weight decreases.
- 30 A diver, weighing 720 N, stands at the end of a springboard measuring 3 m long.



What is the moment about the support due to the weight of the diver?

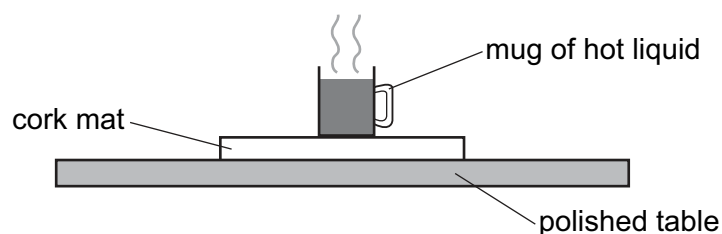
- A 720 Nm
- B 720×3 Nm
- C $\frac{3}{720}$ Nm
- D $\frac{720}{3}$ Nm

- 31 A man pushes a heavy box across a floor. He exerts a force of 80 N and the box moves 4.0 m in 5.0 seconds.



What useful power does the man develop?

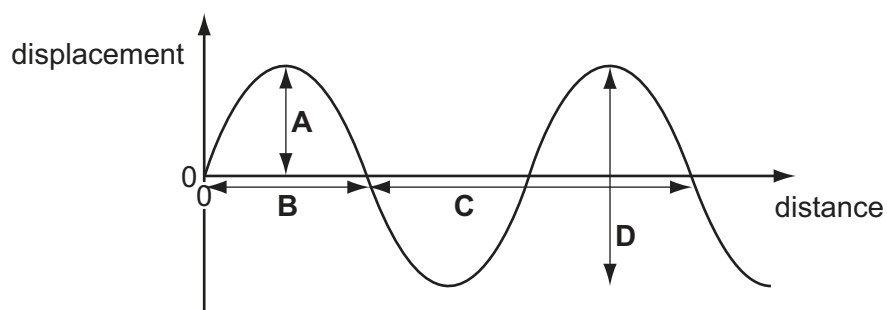
- A 4.0W B 64W C 100W D 1600W
- 32 To protect a polished table, a cork mat may be put on the table underneath a mug containing hot liquid.



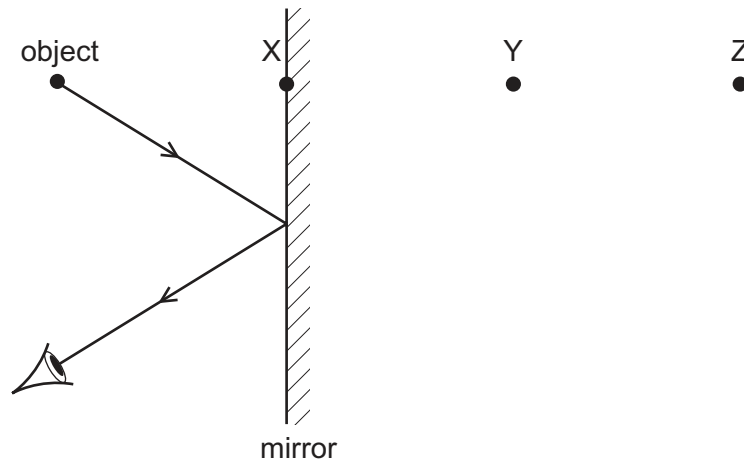
Why is this effective?

- A Cork is a good conductor.
 B Cork is a good radiator.
 C Cork is a poor conductor.
 D Cork is a poor radiator.
- 33 The diagram shows the displacement across a wave.

Which value is multiplied by the frequency to give the speed of the wave?



34 The diagram shows the reflection, in a plane mirror, of a ray of light from an object.



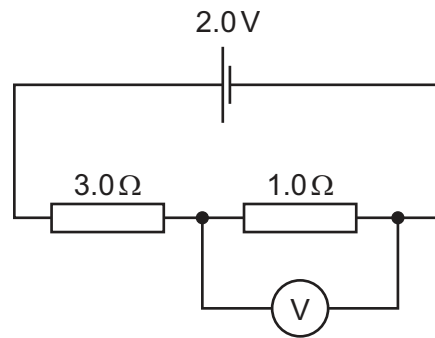
Which statement is correct?

- A The image is at X.
- B The image is between X and Y.
- C The image is at Y.
- D The image is between Y and Z.

35 Which diagram correctly shows the directions of the electrostatic forces on a pair of charged spheres?

- A
- B
- C
- D

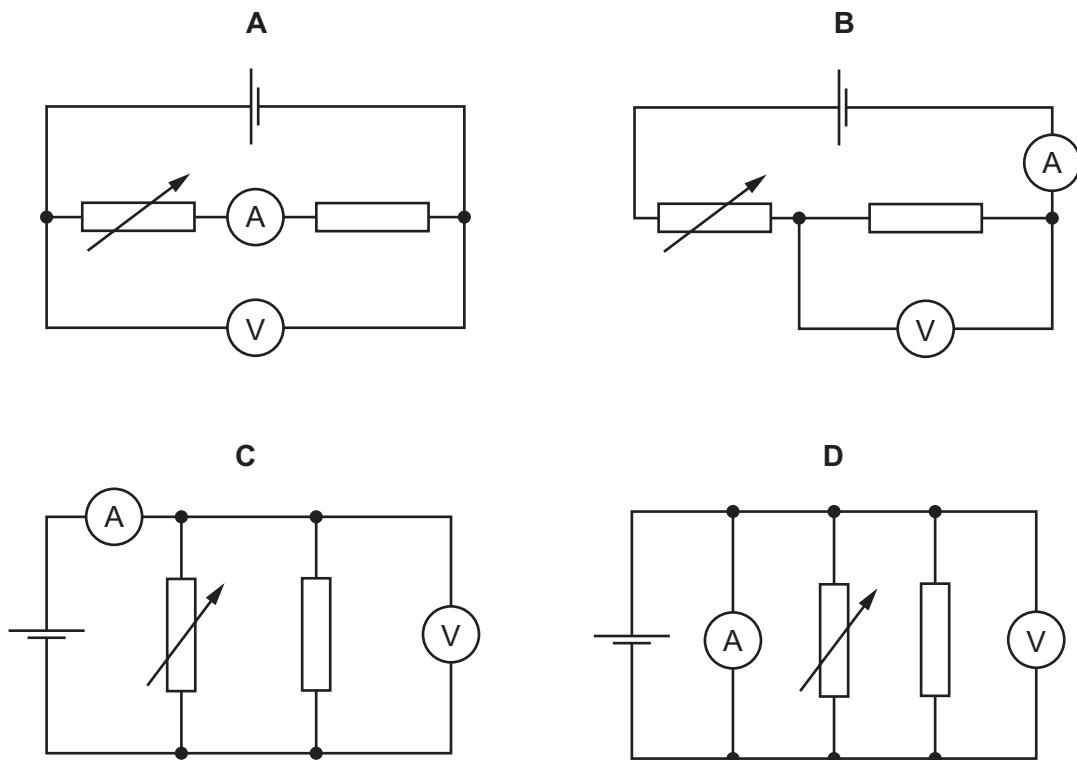
36 The diagram shows a voltmeter connected across a 1.0Ω resistor in a circuit.



What is the reading on the voltmeter?

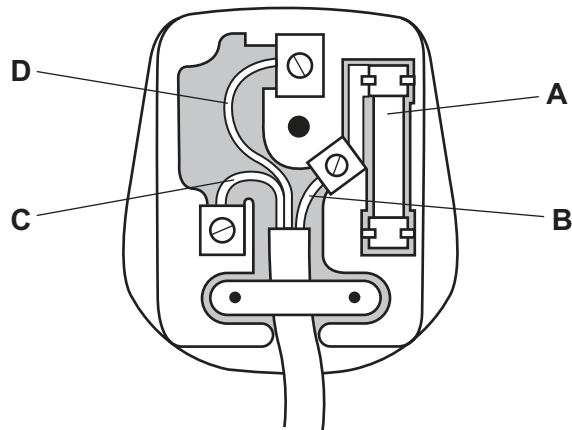
- A 0.5V B 1.0V C 1.5V D 2.0V

37 Which circuit may be used to measure the resistance of a fixed resistor?



38 The diagram shows a plug for a device. The device has an outer metal case.

Which part is connected to the metal case of the device?

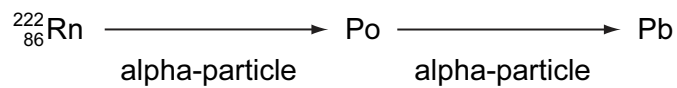


39 Which particle is positively-charged?

- A electron
- B neutral atom
- C neutron
- D proton

40 Radon is a naturally occurring radioactive gas.

The first two steps in the decay process of radon each involves the emission of an alpha-particle.



Which correctly represents the Pb nuclide?

- A ${}_{82}^{214}\text{Pb}$
- B ${}_{84}^{218}\text{Pb}$
- C ${}_{86}^{220}\text{Pb}$
- D ${}_{88}^{222}\text{Pb}$

DATA SHEET
The Periodic Table of the Elements

		Group																																										
I	II	III	IV	V	VI	VII	0					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	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					84 Kr Krypton 36																																
39 K Potassium 19	40 Ca Calcium 20	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36					131 Xe Xenon 54																																
85 Rb Rubidium 37	88 Sr Strontium 38	101 Ru Ruthenium 44	106 Pd Palladium 46	103 Rh Rhodium 45	112 Cd Cadmium 48	122 Sb Antimony 51	128 Te Tellurium 52					209 Po Polonium 84																																
133 Cs Caesium 55	137 Ba Barium 56	190 Os Osmium 76	195 Pt Platinum 78	192 Ir Iridium 77	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82					86 Rn Radon 86																																
226 Fr Francium 87	227 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="width: 5%;"></td> <td style="width: 5%; text-align: center;">a</td> <td style="width: 5%; text-align: center;">X</td> <td style="width: 5%; text-align: center;">b</td> <td style="width: 5%;"></td> <td style="width: 5%; text-align: center;">140 Ce Cerium 58</td> <td style="width: 5%; text-align: center;">141 Pr Praseodymium 59</td> <td style="width: 5%; text-align: center;">144 Nd Neodymium 60</td> <td style="width: 5%; text-align: center;">150 Sm Samarium 62</td> <td style="width: 5%; text-align: center;">152 Eu Europium 63</td> <td style="width: 5%; text-align: center;">157 Gd Gadolinium 64</td> <td style="width: 5%; text-align: center;">162 Dy Dysprosium 66</td> <td style="width: 5%; text-align: center;">165 Ho Holmium 67</td> <td style="width: 5%; text-align: center;">167 Er Erbium 68</td> <td style="width: 5%; text-align: center;">169 Tm Thulium 69</td> <td style="width: 5%; text-align: center;">173 Yb Ytterbium 70</td> <td style="width: 5%; text-align: center;">175 Lu Lutetium 71</td> <td style="width: 5%;"></td> <td style="width: 5%; text-align: center;">232 Th Thorium 90</td> <td style="width: 5%; text-align: center;">238 U Uranium 92</td> <td style="width: 5%; text-align: center;">238 Pa Protactinium 91</td> <td style="width: 5%; text-align: center;">238 Np Neptunium 93</td> <td style="width: 5%; text-align: center;">238 Pu Plutonium 94</td> <td style="width: 5%; text-align: center;">238 Am Americium 95</td> <td style="width: 5%; text-align: center;">238 Cm Curium 96</td> <td style="width: 5%; text-align: center;">238 Bk Berkelium 97</td> <td style="width: 5%; text-align: center;">238 Cf Californium 98</td> <td style="width: 5%; text-align: center;">238 Es Einsteinium 99</td> <td style="width: 5%; text-align: center;">238 Fm Fermium 100</td> <td style="width: 5%; text-align: center;">238 Md Mendelevium 101</td> <td style="width: 5%; text-align: center;">238 No Nobelium 102</td> <td style="width: 5%; text-align: center;">238 Lr Lawrencium 103</td> </tr> </table>														a	X	b		140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	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	238 U Uranium 92	238 Pa Protactinium 91	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103
	a	X	b		140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	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	238 U Uranium 92	238 Pa Protactinium 91	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103													
<p>Key</p> <p>a = relative atomic mass X = atomic symbol b = proton (atomic) number</p>																																												

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