

COMBINED SCIENCE

5129/12

Paper 1 Multiple Choice

May/June 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.

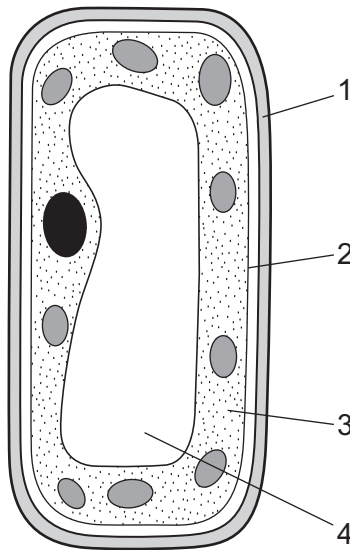
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

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

1 The diagram shows a plant cell.



Which structures are the cell membrane, cell wall and cytoplasm?

	cell membrane	cell wall	cytoplasm
A	1	2	3
B	1	2	4
C	2	1	3
D	2	1	4

2 By which process does oxygen move into the blood from an alveolus?

- A** diffusion down a concentration gradient
- B** diffusion up a concentration gradient
- C** osmosis down a concentration gradient
- D** osmosis up a concentration gradient

3 What is a function of enzymes in a seed during germination?

- A** to break down insoluble food into soluble substances
- B** to increase the rate of photosynthesis
- C** to increase water absorption
- D** to make starch for storage

4 Where do carbon dioxide and water enter a plant?

	carbon dioxide	water
A	chloroplast	vacuole
B	chloroplast	root hair cell
C	stomata	vacuole
D	stomata	root hair cell

5 A student was studying animal nutrition.

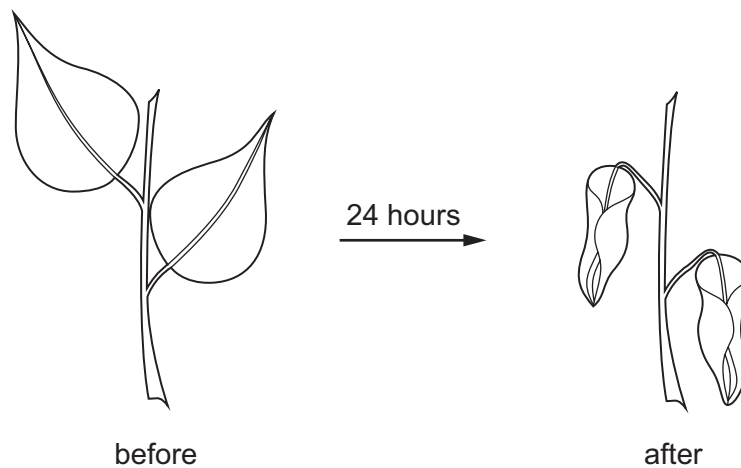
He wrote down descriptions of some processes that take place.

- 1 break down of food into smaller pieces to increase the surface area
- 2 contraction of the circular and longitudinal muscles in the gut wall
- 3 movement of digested food products across the small intestine wall
- 4 production of enzymes for the chemical breakdown of food

Which two describe the processes of chewing and peristalsis?

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

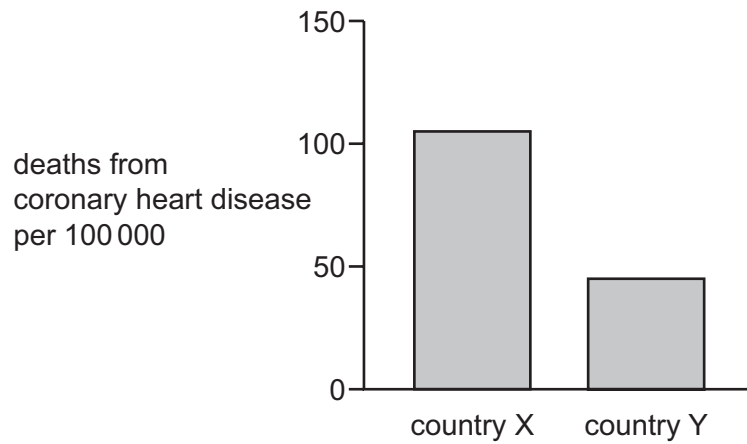
6 The diagram shows a plant before and after a period of 24 hours.



Which row best explains what has happened during the 24 hours?

	stomata	water vapour
A	closed	lost
B	closed	retained
C	open	lost
D	open	retained

7 The graph shows the death rates from coronary heart disease in two different countries.



What could be an explanation for the difference between the two countries?

- A Fewer people in country X are obese.
- B People in country X eat more saturated fat.
- C People in country Y smoke more.
- D People in country Y take less exercise.

8 Which row describes aerobic respiration?

	requires oxygen	amount of energy released
A	no	large
B	no	small
C	yes	large
D	yes	small

9 The body cannot store amino acids.

Which flow chart correctly shows what happens to excess amino acids in the body?

- A** amino acids in the blood → broken down in kidney → become urea in the urine → travel to liver → become urea in the blood
- B** amino acids in the blood → broken down in kidney → become urea in the blood → travel to liver → become urea in the urine
- C** amino acids in the blood → broken down in liver → become urea in the urine → travel to kidney → become urea in the blood
- D** amino acids in the blood → broken down in liver → become urea in the blood → travel to kidney → become urea in the urine

10 Some statements about substances in the body are listed.

- 1 They are carried by the blood.
- 2 They are catalysts.
- 3 They are chemical messengers.
- 4 They can be reused.

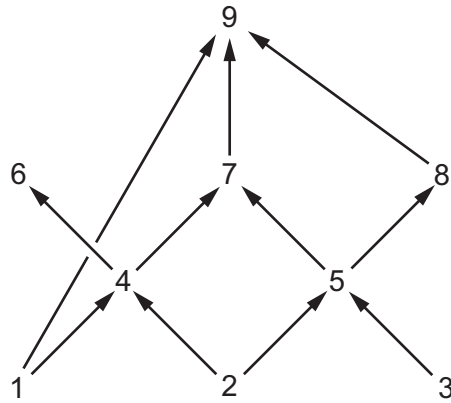
Which statements are correct for hormones?

- A** 1, 2 and 3 **B** 1, 2 and 4 **C** 1 and 2 only **D** 1 and 3 only

11 Which effect is **not** a result of alcohol abuse?

- A** addiction
- B** increased reaction times
- C** increased self-control
- D** severe withdrawal symptoms

12 The diagram represents nine organisms in a food web.



Which of the organisms is a producer and which is a carnivore?

	producer	carnivore
A	1	4
B	2	6
C	9	1
D	9	8

13 Which factors can affect a woman's menstrual cycle?

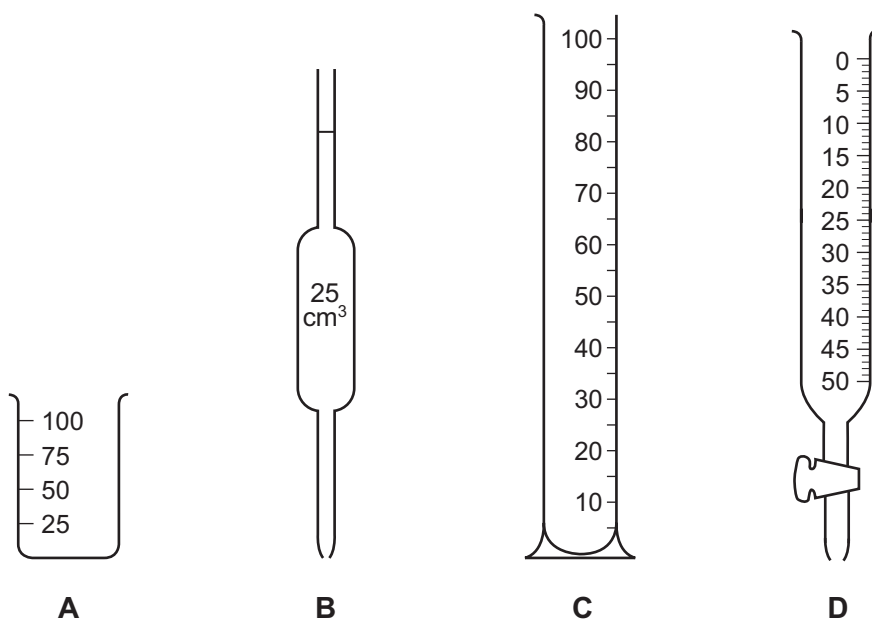
	age	blood group	diet	stress
A	✓	✓	x	✓
B	✓	x	✓	✓
C	✓	x	✓	x
D	x	✓	x	✓

key

✓ = can affect

x = cannot affect

- 14 Which piece of apparatus would be most suitable to measure accurately the volume of acid needed to neutralise 25.0 cm^3 of an alkali?



- 15 Which statement correctly describes isotopes of an element?

- A** atoms with the same number of electrons but different number of protons
- B** atoms with the same number of neutrons but different numbers of protons
- C** atoms with the same number of protons but different numbers of electrons
- D** atoms with the same number of protons but different numbers of neutrons

- 16 Magnesium chloride, MgCl_2 , is an ionic compound.

In terms of atoms and electrons, which statement correctly describes the formation of the ionic bonds in this compound?

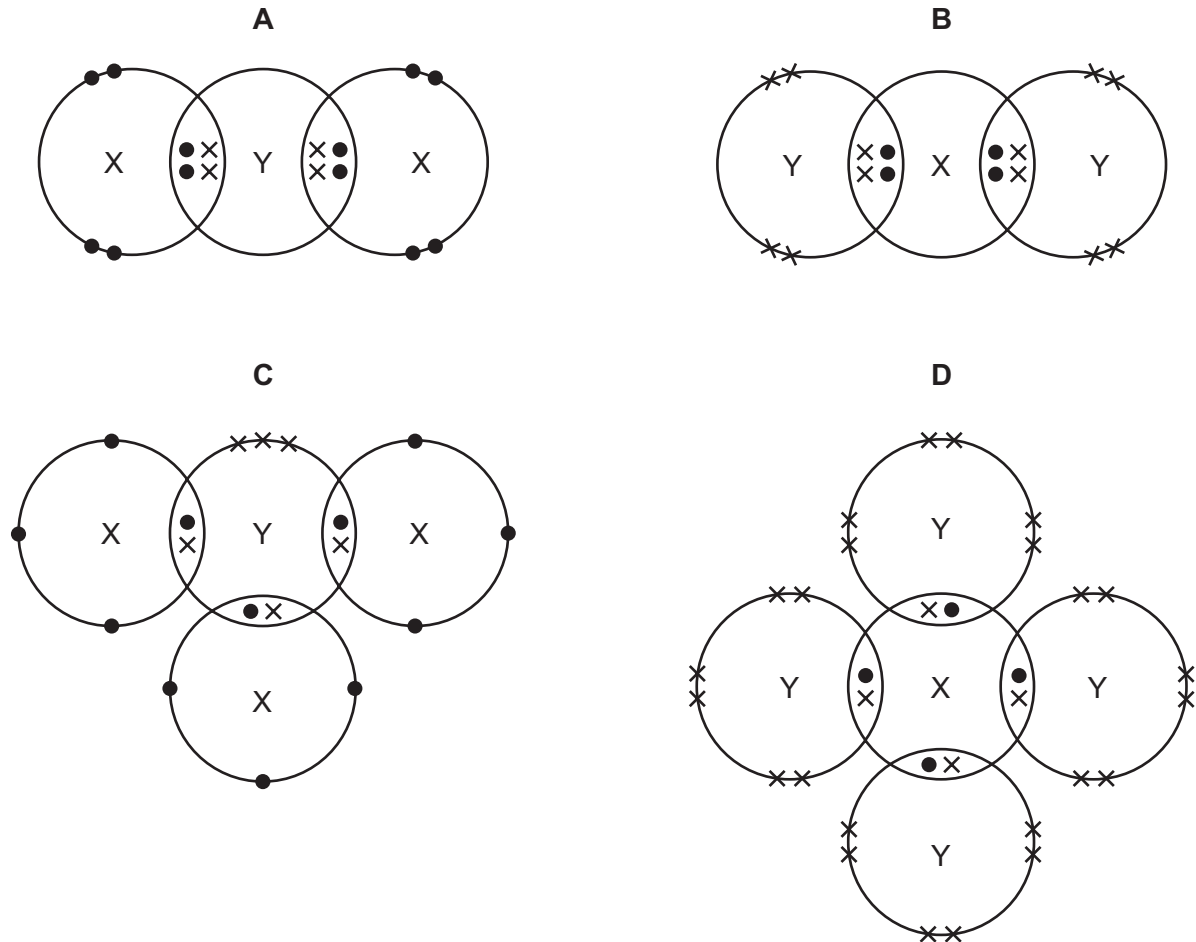
- A** A magnesium atom gains two electrons and two chlorine atoms each gain an electron.
- B** A magnesium atom gains two electrons and two chlorine atoms each lose an electron.
- C** A magnesium atom loses two electrons and two chlorine atoms each gain an electron.
- D** A magnesium atom loses two electrons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

17 Element X and element Y combine to form a covalent compound.

Atoms of element X have four outer electrons.

Atoms of element Y have six outer electrons.

Which dot-and-cross diagram for the compound of X and Y is correct?



18 Information about some chemical elements is given below.

element	symbol	metal or non-metal	group in Periodic Table
rubidium	Rb	metal	I
indium	In	metal	III
sulfur	S	non-metal	VI
iodine	I	non-metal	VII

Which formula is **not** correct?

A In_2S_3

B InI_3

C RbI

D RbS_2

19 P, Q, R and S are four different solutions.

P reacts with sodium hydroxide to form a salt and water.

Q reacts with hydrochloric acid to form a salt and water.

R reacts with ammonium chloride to form ammonia.

S reacts with potassium carbonate to form carbon dioxide.

Which row is correct?

	acids	bases
A	P, R and S	Q
B	P and R	Q and S
C	P and S	Q and R
D	Q and R	P and S

20 Four elements in Group VII of the Periodic Table are shown.

chlorine bromine iodine astatine

Which row describes the properties of astatine?

	state at r.t.p.	colour of vapour
A	gas	dark
B	liquid	pale
C	solid	dark
D	solid	pale

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

Results of some experiments are as follows.

- P reacts slowly with dilute hydrochloric acid to produce hydrogen.
- Q reacts very vigorously with water to produce hydrogen.
- R does not react with dilute hydrochloric acid.
- S reacts violently with water, producing flames.

What are P, Q, R and S?

	P	Q	R	S
A	copper	potassium	copper	magnesium
B	copper	potassium	zinc	magnesium
C	iron	sodium	copper	potassium
D	iron	sodium	zinc	potassium

22 Garden tools are often galvanised to prevent the steel from rusting.

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

Which metal is used?

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

23 Argon, neon, nitrogen and oxygen are all present in air.

What is the order of volume composition (%) of these gases in the atmosphere?

	highest %	—————→		lowest %
A	nitrogen	argon	oxygen	neon
B	nitrogen	oxygen	argon	neon
C	oxygen	neon	nitrogen	argon
D	oxygen	nitrogen	neon	argon

24 Which statement about hydrogen is **not** correct?

- A It gives a loud squeaky pop with a glowing splint.
- B It is formed when sodium metal reacts with cold water.
- C It is manufactured by cracking of an alkane.
- D It is used to make ammonia.

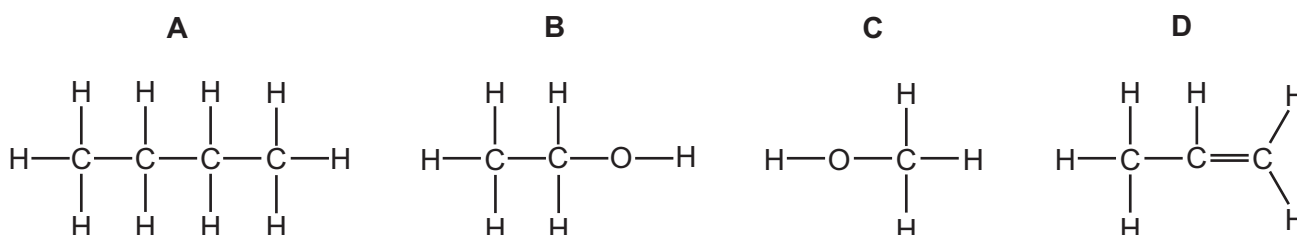
25 A student suggested the following four statements about the members of a homologous series.

- 1 They have similar chemical properties.
- 2 They have the same melting points.
- 3 Their molecules all contain at least two carbon atoms.
- 4 They can be represented by the same general formula.

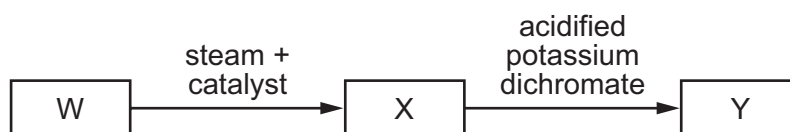
Which statements are correct?

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

26 Which diagram represents a molecule of an alkane?



27 The diagram shows a reaction scheme.



The formulae of W is C_2H_4 .

Which compounds do W, X and Y represent?

	W	X	Y
A	ethane	ethanol	ethanoic acid
B	ethane	ethene	ethanol
C	ethene	ethanoic acid	ethanol
D	ethene	ethanol	ethanoic acid

28 What **cannot** be affected by the application of a force to an object at rest?

- A acceleration
- B direction of movement
- C mass
- D speed

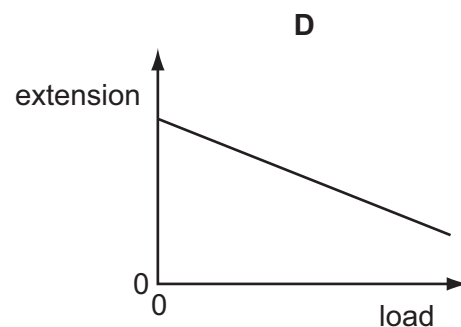
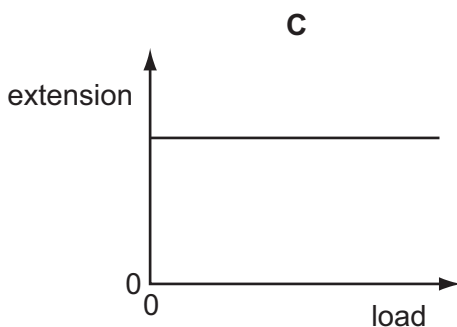
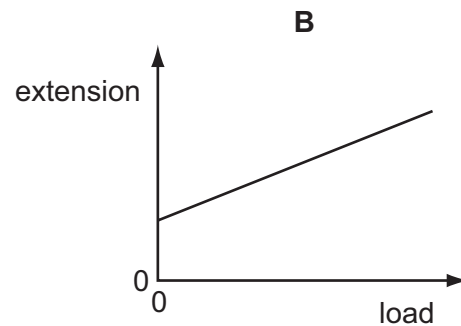
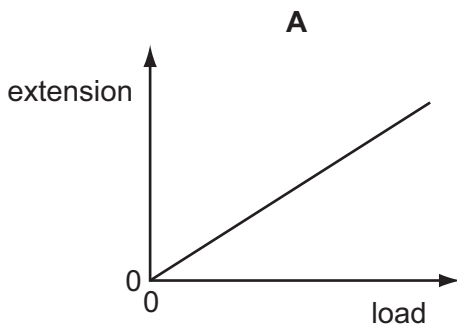
29 The gravitational field strength on the Moon is about a sixth of that on the surface of the Earth. On Earth, an astronaut weighs 900 N and the gravitational field strength is 10 N/kg.

What is the astronaut's mass on the Moon?

- A 15 kg
- B 90 kg
- C 150 N
- D 900 N

30 A student adds different loads to the end of a spring. She measures the extension in each case and plots a graph of extension against load.

Which graph is correct?



31 A crane lifts a concrete block, whose weight is 60 000 N, to a height of 20 m in 30 s.

What useful power is achieved by the crane?

- A 100 W
- B 4000 W
- C 40 000 W
- D 90 000 W

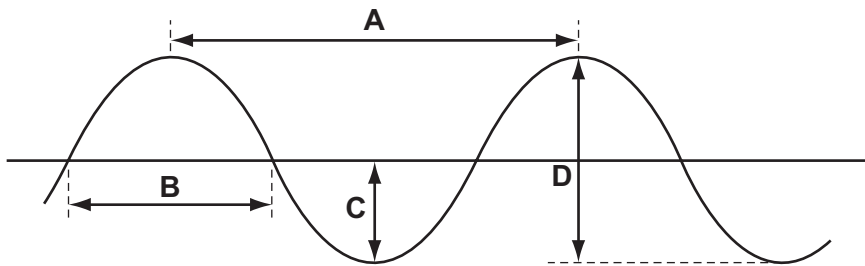
- 32 A metal can containing hot water cools more quickly if its outer wall is painted dull black, rather than shiny white.

This is because black surfaces are better than white surfaces at

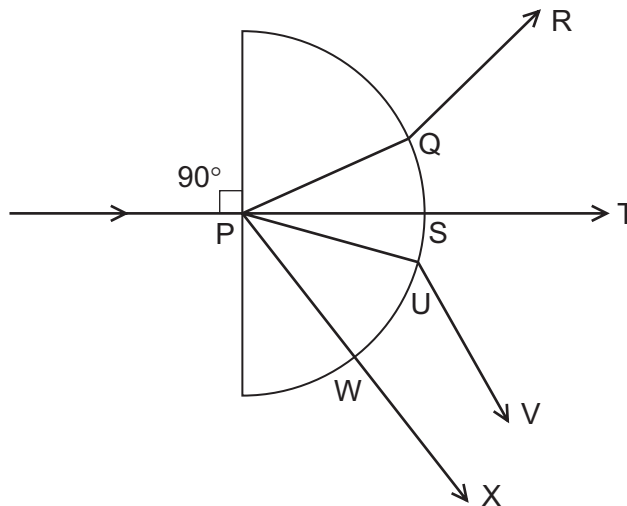
- A absorbing radiation.
- B conducting.
- C convecting.
- D emitting radiation.

- 33 The diagram shows the cross-section of a water wave.

Which arrow shows the amplitude of the wave?



- 34 A ray of light enters a semicircular glass block at P as shown.

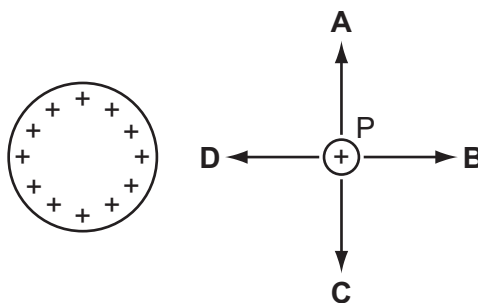


Which path is taken by the ray?

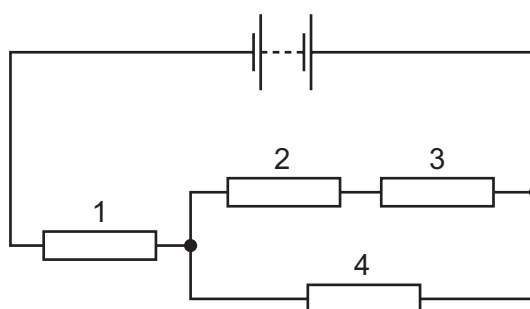
- A PQR
- B PST
- C PUV
- D PWX

- 35 A small positive charge, P, is positioned close to a positively charged sphere.

What is the direction of the electrostatic force on P?



- 36 The diagram shows four resistors of equal resistance connected to a battery.



In which resistor does the current have the largest value?

- A** 1 **B** 2 **C** 3 **D** 4
- 37 A mobile phone (cell phone) takes 4.0 hours to recharge from a 5.0 V power supply.
The current is 0.25 A.
How much electrical energy is taken from the power supply?
- A** 5.0 J **B** 300 J **C** 720 J **D** 18 000 J
- 38 How does a student determine if a material is magnetic?
- A** Find out if the material is a metal or a non-metal.
B Find out if the material is a conductor or an insulator.
C Find out if the material can be given an electric charge.
D Find out if the material affects the direction in which a compass needle points.

39 Which particles are present in the oxygen nuclide $^{17}_8\text{O}$?

	neutrons	protons
A	8	9
B	9	17
C	9	8
D	17	8

40 How do the ionising abilities of beta-particles and gamma-rays compare with the ionising ability of alpha-particles?

	beta-particles	gamma-rays
A	less	less
B	less	more
C	more	less
D	more	more

DATA SHEET
The Periodic Table of the Elements

		Group																						
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI												
		1 H Hydrogen 1										4 He Helium 2												
7 Li Lithium 3	9 Be Beryllium 4											19 F Fluorine 9												
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	36 Ar Argon 18						20 Ne Neon 10											
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	101 Ru Ruthenium 44	101 Rh Rhodium 45	103 Pd Palladium 46	106 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	127 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	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86							
226 Ra Radium 88	227 Ac Actinium 89											169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71										
												162 Dy Dysprosium 66	167 Er Erbium 68	169 Fm Fermium 100	171 Md Mendelevium 101	173 No Nobelium 102	175 Lr Lawrencium 103							
												140 Ce Cerium 58	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	169 Er Erbium 68	173 Yb Ytterbium 70	175 Lu Lutetium 71		
												232 Th Thorium 90	238 U Uranium 92	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

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

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

Key

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