Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/23**

Paper 2 Multiple Choice (Extended) **October/November 2019**

45 minutes

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

5608376321

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.

IB19 11_0654_23/3RP

1 What is a plant demonstrating when carbon dioxide is released from its cells?

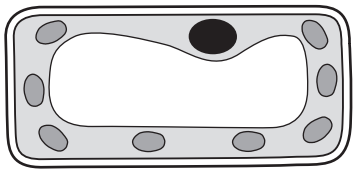
A assimilation

B egestion

C excretion

D nutrition

2 The diagram shows a section through a cell.



What shows that this is a plant cell?

A It has a cell membrane.

B It has a nucleus.

C It has a permanent vacuole.

D It has cytoplasm.

3 Which result with the biuret test shows that protein is present?

A blue

B green

C orange

D purple

4 Four test-tubes were set up to investigate the effect of pH on the digestion of protein by the enzyme pepsin, the protease enzyme in the stomach.

Each test-tube contained the same volumes of cloudy egg white suspension and pepsin solution.

The temperature in each tube was the same but the pH differed as shown.

In which test-tube would the suspension clear first?

A pH 2 **B** pH 5 **C** pH 8 **D** pH 11

5 Green plants need magnesium ions.

Which plant process is limited when magnesium is deficient?

A meiosis

B photosynthesis

C pollination

D respiration

6 Where is bile stored?

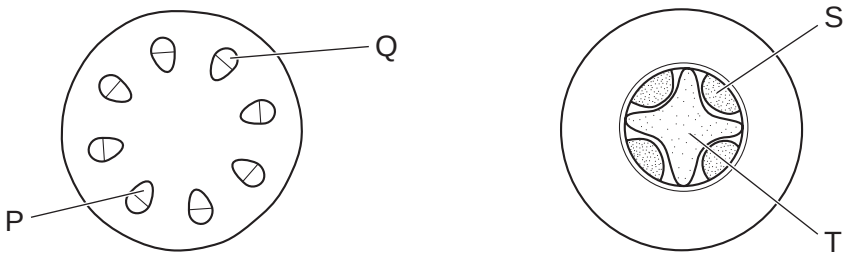
A gall bladder

B liver

C pancreas

D stomach

7 The diagrams show sections through a stem and a root.



stem root

Which indicate the positions of the xylem?

A P and S **B** P and T **C** Q and S **D** Q and T

8 What are the products of the anaerobic respiration of glucose in yeast?

A alcohol and carbon dioxide

B alcohol only

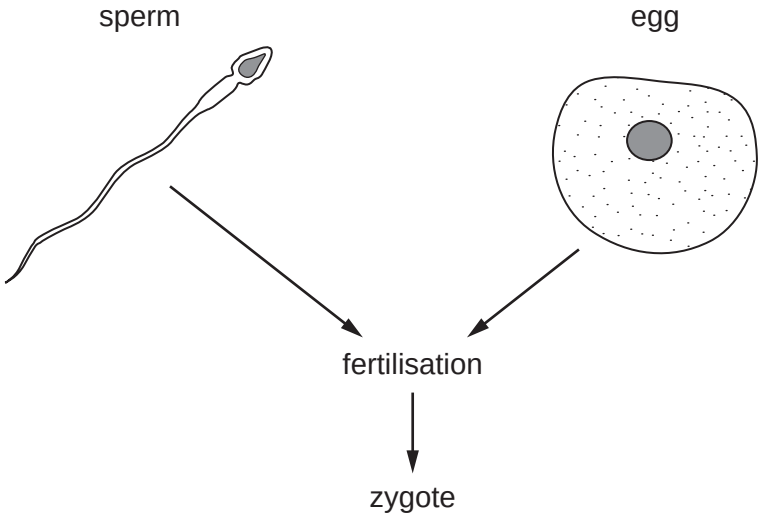
C lactic acid and carbon dioxide

D lactic acid only

9 Which actions are voluntary and which are involuntary?

	a change in pupil size due to a change in light intensity	the lens in the eye changing shape during accommodation
A	involuntary	involuntary
B	involuntary	voluntary
C	voluntary	involuntary
D	voluntary	voluntary

10 The diagram shows a type of reproduction.



Which row is correct for this type of reproduction?

	type of reproduction	advantage
A	asexual	offspring are genetically identical
B	asexual	requires two parents
C	sexual	increases variation
D	sexual	offspring produced more quickly

11 A body cell taken from a male kangaroo contains 16 chromosomes in the nucleus.

How many chromosomes would be found in the nucleus of a sperm cell from the same kangaroo and what term describes this number?

	chromosome number	description of number
A	8	diploid
B	8	haploid
C	16	diploid
D	16	haploid

12 In the food chain shown, 10% of the energy is transferred between each trophic level.

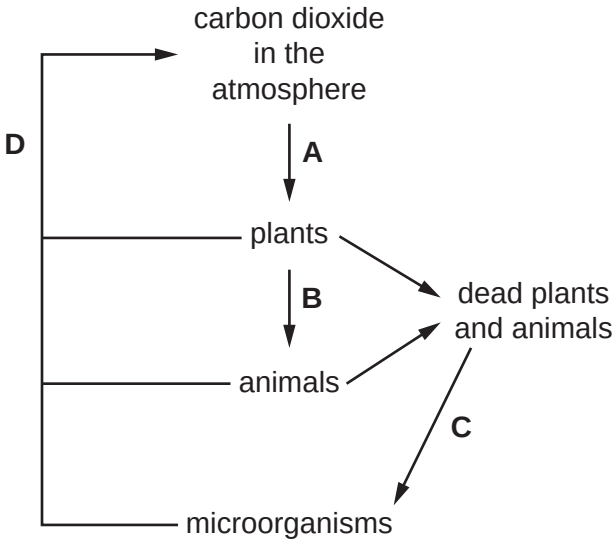
grass → grasshopper → frog → snake → buzzard

For every 100 kJ of energy in the herbivore, how much energy will be transferred to the tertiary consumer?

A 0.1 kJ **B** 1 kJ **C** 10 kJ **D** 100 kJ

13 The diagram shows some of the processes in the carbon cycle.

Which process is respiration?



14 Which property of a substance is used to determine that it is pure?

A colour

B melting point

C pH

D shape of the crystals

15 Which processes are chemical changes?

1 conversion of steam to liquid water

2 cracking of alkanes

3 fractional distillation of petroleum

4 thermal decomposition of calcium carbonate

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

16 Silicon(IV) oxide has a giant molecular structure.

Which row is correct?

	number of oxygen atoms bonded to each silicon atom	number of silicon atoms bonded to each oxygen atom
A	2	2
B	2	4
C	4	2
D	4	4

17 Which sample does **not** contain two moles of hydrogen atoms?

A Avogadro's number of hydrogen molecules

B 1 g of hydrogen molecules

C 18 g of water molecules

D 24 dm^3 hydrogen molecules at room temperature and pressure

18 Concentrated aqueous sodium chloride is electrolysed using inert electrodes.

Which row describes how the number of sodium ions and of chloride ions changes during the electrolysis?

	number of sodium ions	number of chloride ions
A	decreases	decreases
B	decreases	no change
C	no change	decreases
D	no change	no change

19 A redox reaction is shown.

$$Fe + Cu^{2+} \rightarrow Fe^{2+} + Cu$$

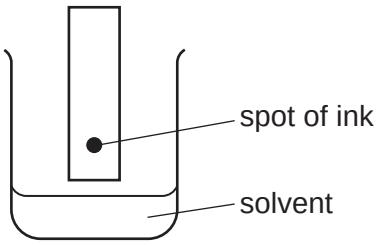
Which substance is the reducing agent?

A Cu **B** Cu^{2+} **C** Fe **D** Fe^{2+}

20 The colours in an ink can be separated by chromatography.

Which diagram shows the correct way to set up the apparatus?

A



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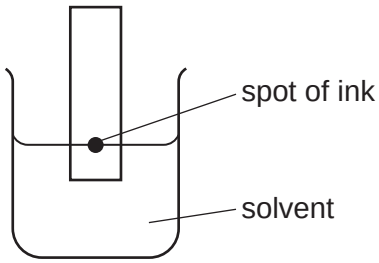

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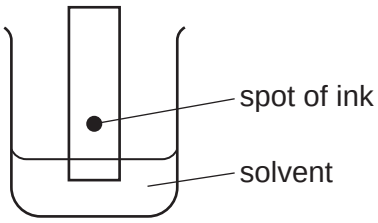

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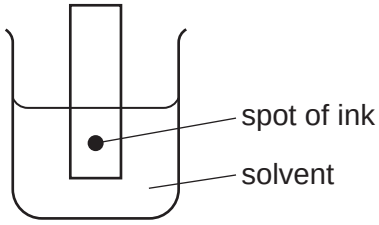


21 Which statement about the Periodic Table is correct?

A Elements are listed in order of neutron number.

B Elements are listed in order of nucleon number.

C Elements are listed in order of proton number.

D Elements are listed in order of relative atomic mass.

22 Which row describes a Group II element in period 3 of the Periodic Table?

	electrical conductivity	number of outer shell electrons
A	good	2
B	good	3
C	poor	2
D	poor	3

23 Which statement describes **all** metals?

A They break when hit with a hammer.

B They conduct electricity.

C They dissolve in water.

D They have high densities.

24 Which pair of substances do **not** react with each other?

A copper and aqueous magnesium sulfate

B iron and aqueous copper(II) sulfate

C magnesium and aqueous zinc sulfate

D zinc and aqueous iron(II) sulfate

25 Which processes produce carbon dioxide?

1 acid reacting with a metal

2 respiration

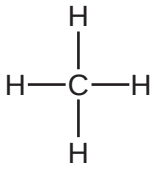
3 combustion of ethanol

4 acid reacting with a metal oxide

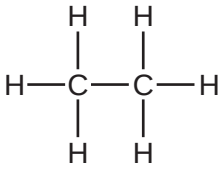
A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

26 Which structure represents ethanol?

A



B



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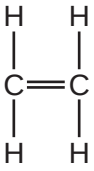

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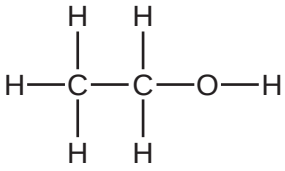
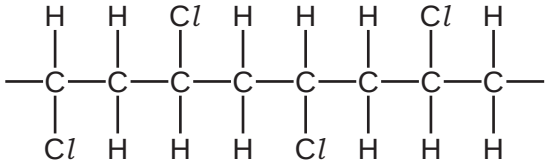
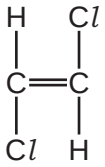


27 A section of a polymer chain is shown.

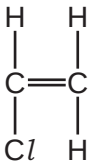


Which monomer is used to make this polymer?

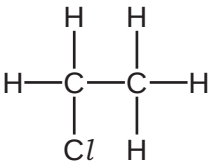
A



B



C



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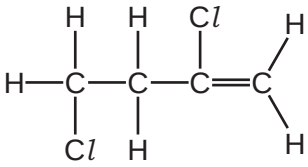


28 There is no resultant force acting on a body.

Which statement is correct?

A The body is either at rest or moving at constant speed in a straight line.

B The body must be at rest.

C The body is gaining speed.

D The body is losing speed.

29 Diagram 1 shows a spring with its length indicated. Diagram 2 shows the same spring with a 20 N load hung from it, and the new length of the spring.

The spring obeys Hooke's Law.

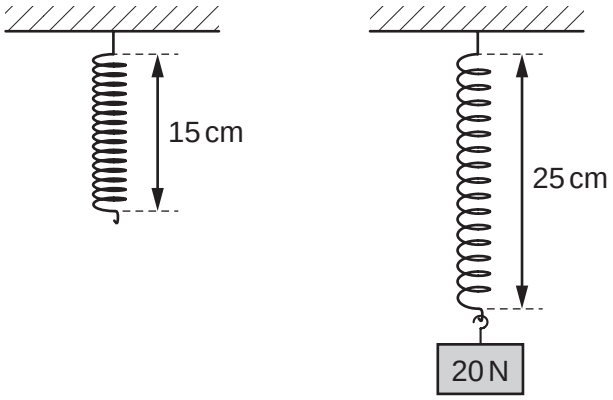
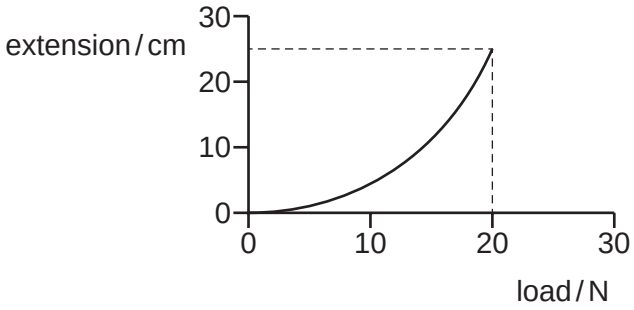


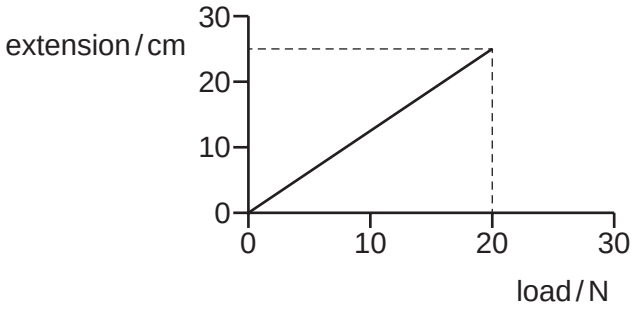
diagram 1 diagram 2

Which graph is the extension-load graph for the spring?

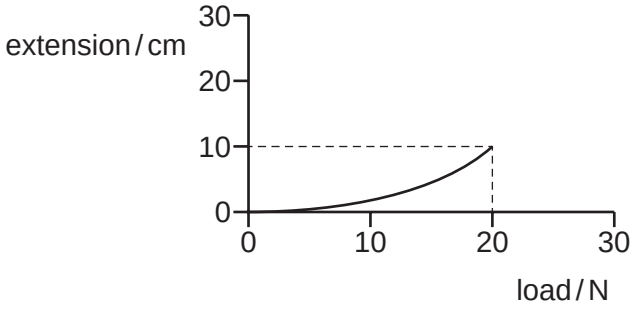
A



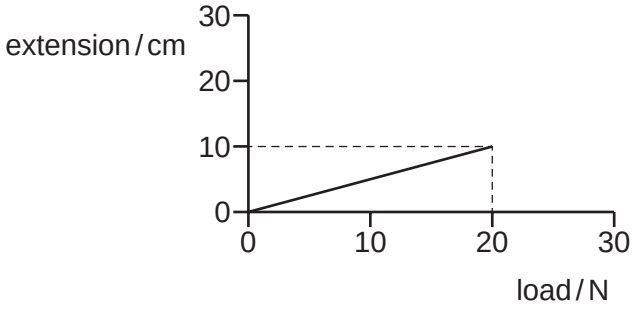
B



C



D



30 A body moving at speed *v* has kinetic energy *E.*

What is the speed of the body when its kinetic energy is 4.0 *E*?

A 0.25 *v* **B** 2.0 *v* **C** 4.0 *v* **D** 16 *v*

31 A student wishes to measure his average power when running up a flight of steps. The energy transferred is 7.0 kJ and the time taken is 14 seconds.

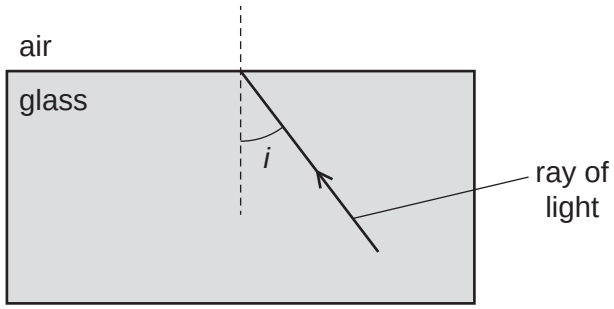
What is the student's average power?

A 0.0020 W **B** 98 W **C** 500 W **D** 98 000 W

32 A glass block is surrounded by air.

Light travelling in the glass block reaches the edge of the block.

The critical angle of the glass is 42 °.



NOT TO SCALE

Which row shows an angle of incidence *i* of the light and what happens to the light when it reaches the edge of the glass block at this angle of incidence?

	i	what happens to the light
A	30^o	totally internally reflected
B	45^o	refracted
C	60^o	totally internally reflected
D	75^o	refracted

33 Which statement about real and virtual images formed by a thin converging lens is correct?

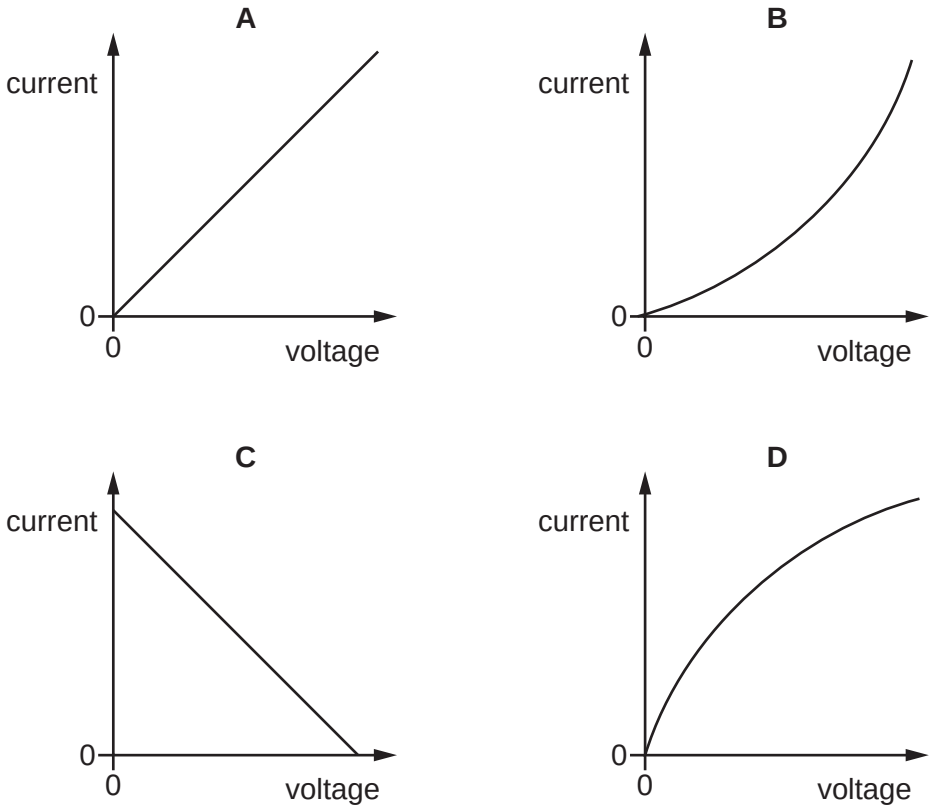
A All real images are enlarged and inverted.

B All real images can be produced on a screen.

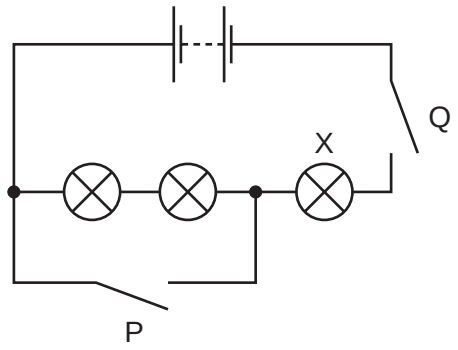
C All virtual images are diminished and upright.

D All virtual images can be produced on a screen.

34 Which graph is the current-voltage characteristic of a filament lamp?



35 The diagram shows a circuit containing two switches P and Q, and three lamps. One lamp is labelled X.



Which of the switches must be closed so that **only** lamp X is lit?

A neither switch

B switch P only

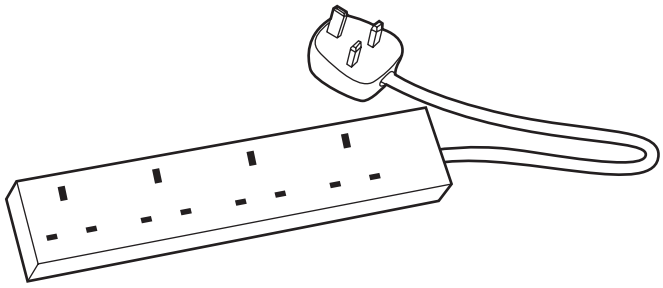
C switch Q only

D switch P and switch Q

36 Which row shows how lamps are connected in a lighting circuit in a house and gives an advantage of connecting them in this way?

	how lamps are connected	advantage of connecting them in this way
A	in parallel	they can be switched separately
B	in parallel	they share the voltage
C	in series	they can be switched separately
D	in series	they share the voltage

37 An electrical extension block has four sockets, a cable which can safely take a current of 6 A and a plug. It is protected by a fuse rated at 5 A.



The extension block is used with four appliances and the 5 A fuse blows. The owner replaces the 5 A fuse with a 13 A fuse.

Why is the extension block now dangerous?

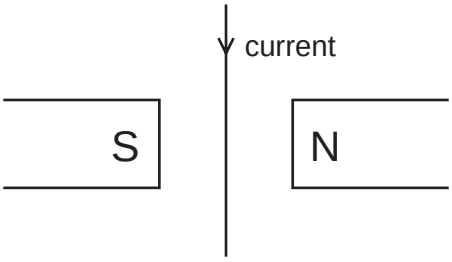
A The appliances may overheat before the fuse blows.

B The cable may overheat before the fuse blows.

C The sockets may burn out before the fuse blows.

D The 13 A fuse may blow too soon.

38 The diagram shows a current-carrying conductor between the poles of a magnet. The direction of the current is shown.



In which direction is the force that acts on the wire?

A into the page

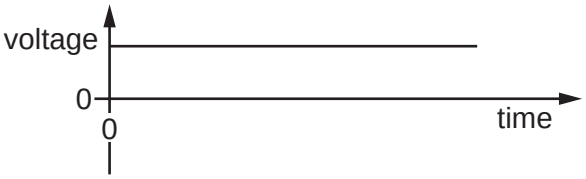
B out of the page

C to the left

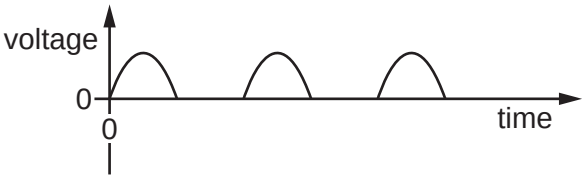
D to the right

39 Which graph shows the output voltage from a simple a.c. generator?

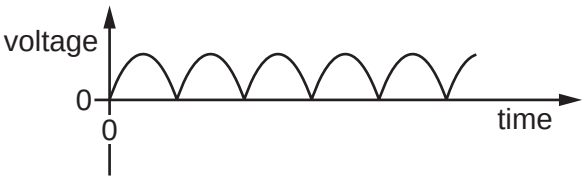
A



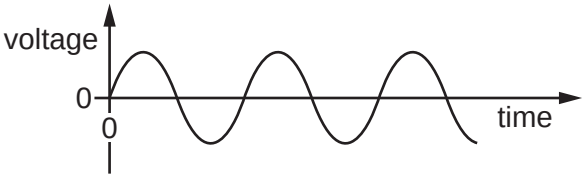
B



C



D



40 Which type of radiation has the greatest ionising effect, and which is the most penetrating?

	greatest ionising effect	most penetrating
A	α-particles	α-particles
B	α-particles	γ-rays
C	γ-rays	α-particles
D	γ-rays	γ-rays

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.).