Cambridge Assessment International Education

Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/11**

Paper 1 Multiple Choice (Core) **May/June 2024**

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **20** pages. Any blank pages are indicated.

1 What is a characteristic of all living organisms?

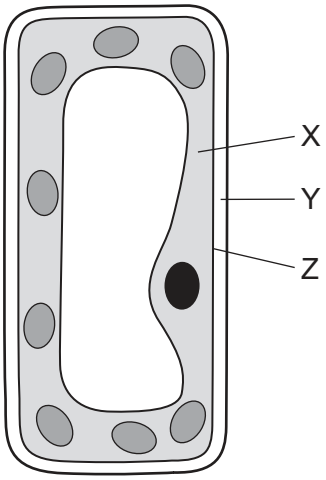
A excretion

B digestion

C photosynthesis

D sexual reproduction

2 The diagram shows a typical plant cell.



Which row is correct?

	cell membrane	cell wall	cytoplasm
A	X	Y	Z
B	X	Z	Y
C	Z	X	Y
D	Z	Y	X

3 Which smaller molecules make up larger fat molecules?

A glucose and amino acids

B glucose and fatty acids

C glycerol and amino acids

D glycerol and fatty acids

4 Which type of molecules are enzymes?

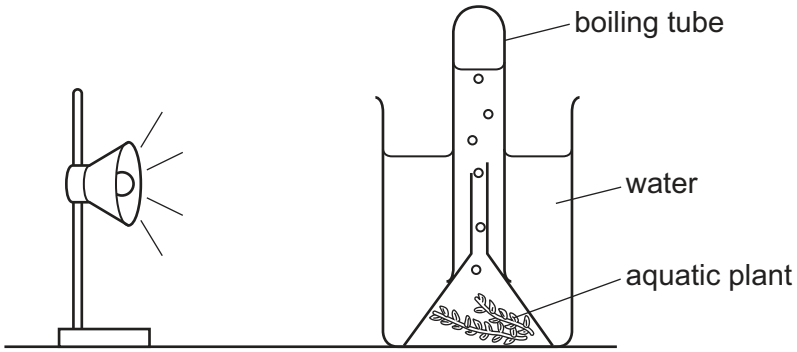
A carbohydrates

B fats

C oils

D proteins

5 The rate of photosynthesis of an aquatic plant is measured by counting the number of bubbles of oxygen produced every minute, as shown. The rate is measured at different light intensities.



Which two variables need to be kept constant?

A size of plant and temperature of the water

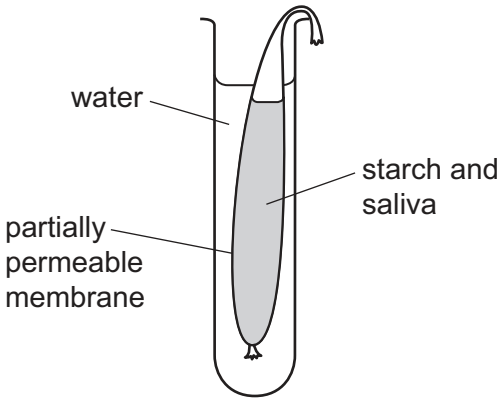
B light intensity and size of the boiling tube

C size of plant and size of the boiling tube

D temperature of the water and light intensity

6 Starch is mixed with saliva and placed into a bag made of a partially permeable membrane.

The bag is placed into a tube filled with water, as shown.



After one hour, sugar molecules are found in the water outside the bag.

Which process has taken place inside the bag?

A assimilation

B digestion

C egestion

D ingestion

7 What is transported by red blood cells?

A glucose

B insulin

C oxygen

D urea

8 A person inflates a balloon by breathing into it.

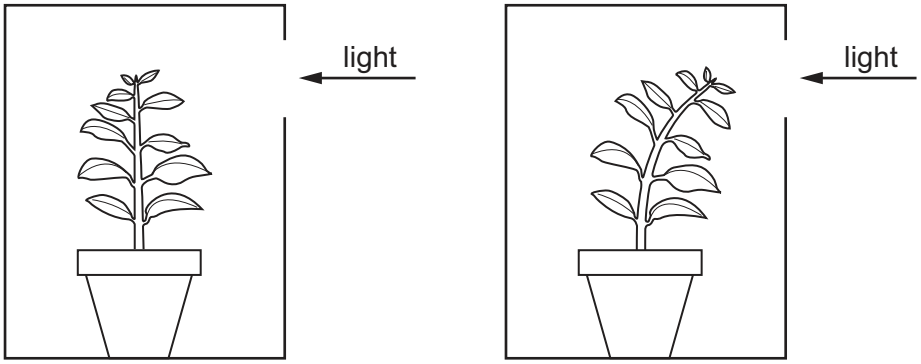
What is the composition of the air in the balloon?

	percentage of oxygen	percentage of carbon dioxide
A	0.04	21
B	4	16
C	16	4
D	21	0.04

9 A plant is placed in a box.

The box has a hole so that the plant is illuminated from one side.

The plant is observed after one week. The result is shown.



What explains the growth of the plant after one week?

A Plant shoots grow towards light, showing phototropism.

B Plant shoots grow towards gravity, showing gravitropism.

C Plant shoots grow towards light, showing gravitropism.

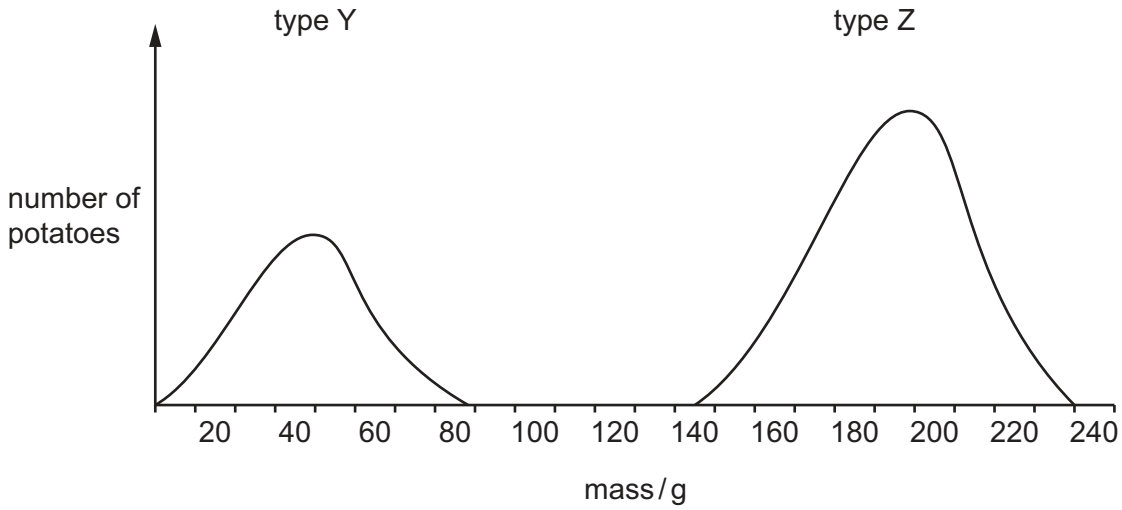
D Plant shoots grow towards gravity, showing phototropism.

10 Which row is correct for sexual reproduction?

	number of parents	offspring
A	one	genetically different
B	one	genetically identical
C	two	genetically different
D	two	genetically identical

[Turn over

11 The graph shows the masses of samples of two different types of potato, Y and Z.



What is shown by the graph?

A Genes do not affect the mass of potatoes.

B Type Y potatoes show continuous variation.

C Type Z potatoes are smaller than type Y.

D Type Z potatoes show discontinuous variation.

12 A food chain is shown.

plant → insect → songbird → hawk

Which statements are correct?

1 The hawk is a consumer.

2 The insect is a carnivore.

3 The songbird is a herbivore.

4 The plant is a producer.

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

13 Which process removes carbon dioxide from the atmosphere?

A combustion

B decomposition

C photosynthesis

D respiration

14 Cyclopentane is a hydrocarbon.

The melting point of cyclopentane is –94 °C and its boiling point is 49 °C.

In process 1, the temperature of cyclopentane changes from 55 °C to 45 °C.

In process 2, the temperature of cyclopentane changes from –100 °C to –90 °C.

Which row identifies the changes in processes 1 and 2?

	1	2
A	boiling	freezing
B	boiling	melting
C	condensation	freezing
D	condensation	melting

15 Which statements about chemical changes are correct?

1 The separation of petroleum into gasoline, naphtha and diesel is a chemical change.

2 The separation of water into hydrogen and oxygen is a chemical change.

3 In a chemical change, a new substance is always formed.

4 In a chemical change, heat is always released.

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

16 Which elements react together to form an ionic compound?

A carbon and oxygen

B nitrogen and hydrogen

C potassium and bromine

D sodium and lithium

17 Hydrogen peroxide is a compound.

A molecule of hydrogen peroxide can be represented as shown.

key

● = oxygen atom

○ = hydrogen atom

What is the formula of hydrogen peroxide?

A HO **B** H_2O_2 **C** H_2O **D** 2OH

18 When concentrated aqueous sodium chloride is electrolysed using inert electrodes, the remaining solution turns red litmus paper to blue.

Which substance causes this colour change?

A chlorine

B hydrogen

C hydrochloric acid

D sodium hydroxide

19 When aqueous sodium hydroxide reacts with dilute hydrochloric acid, the temperature of the reaction mixture increases.

Ice cubes take in energy when they melt.

Which row is correct?

	sodium hydroxide + hydrochloric acid	melting ice cubes
A	endothermic	exothermic
B	exothermic	endothermic
C	endothermic	endothermic
D	exothermic	exothermic

20 Dilute hydrochloric acid reacts with calcium carbonate.

The equation for the reaction is shown.

$$CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$$

Which change increases the rate of the reaction?

A decreasing the temperature of the hydrochloric acid

B increasing the concentration of the hydrochloric acid

C increasing the size of the calcium carbonate particles

D increasing the volume of the hydrochloric acid

21 Which reactions involve oxidation?

1 $C + O_2 \rightarrow CO_2$

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

3 $2Mg + O_2 \rightarrow 2MgO$

4 $CaCO_3 \rightarrow CaO + CO_2$

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

22 Salts are made when four substances react separately with dilute hydrochloric acid.

1 magnesium

2 magnesium carbonate

3 magnesium hydroxide

4 magnesium oxide

Which substances produce a gas when reacted with dilute hydrochloric acid?

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

23 Lead has a high density of $11.3\,g/cm^3$. Lead(II) iodide is a bright yellow solid.

Which property of lead is **not** a property of a transition element?

A Lead conducts electricity.

B Lead forms alloys.

C Lead has a relatively low melting point.

D Lead(II) oxide is basic.

24 Which statements about the noble gas helium are correct?

1 It is unreactive.

2 Atoms of helium have two electrons in their outer electron shell.

3 Atoms of helium have incomplete outer electron shells.

4 The formula of helium gas is He_2.

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

25 Water vapour, carbon dioxide and the noble gases are removed from a $100\,cm^3$ sample of clean air.

What is the remaining volume?

A $1\,cm^3$ **B** $21\,cm^3$ **C** $78\,cm^3$ **D** $99\,cm^3$

26 Which statement about manufacturing processes is correct?

A Limestone is manufactured from calcium oxide.

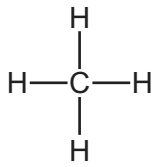
B Limestone is manufactured from acidic waste products.

C Ethene is manufactured by addition polymerisation.

D Sulfuric acid is manufactured from sulfur.

27 Which molecule reacts with aqueous bromine?

A



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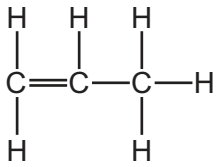

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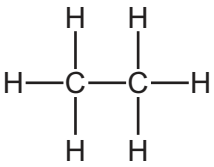

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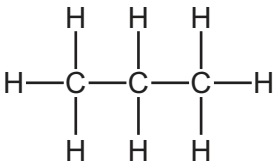
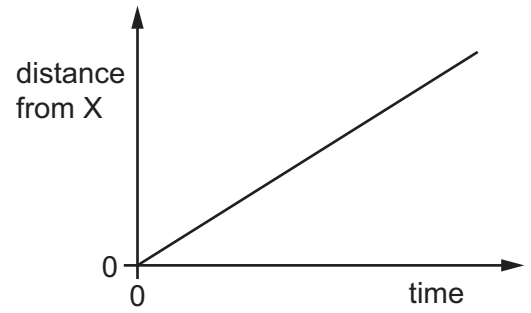
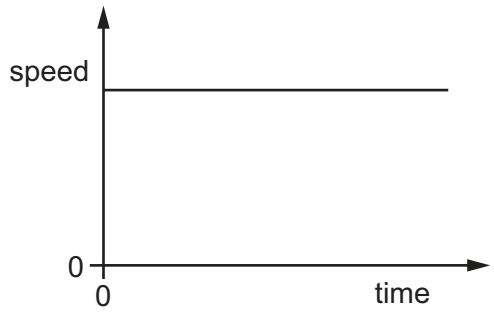
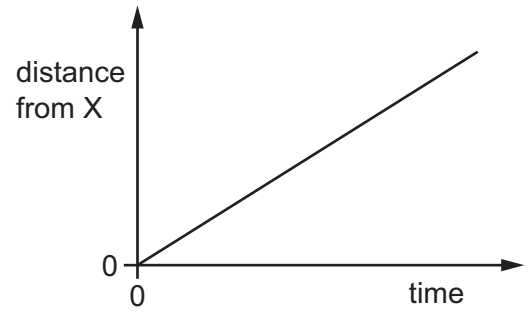
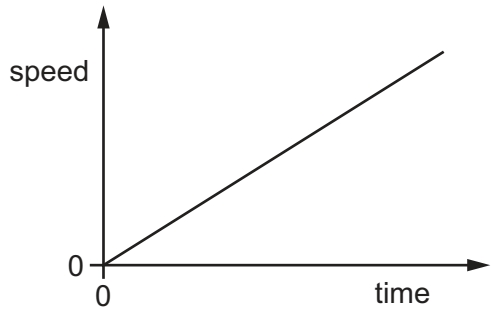
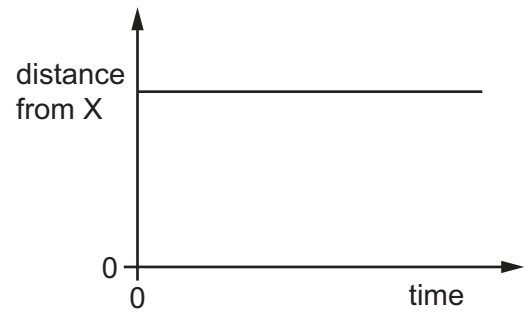
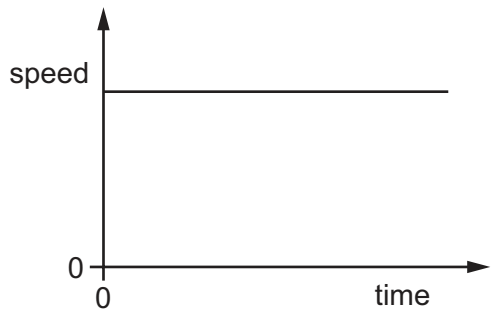
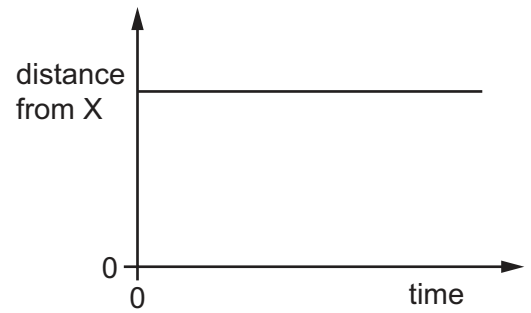
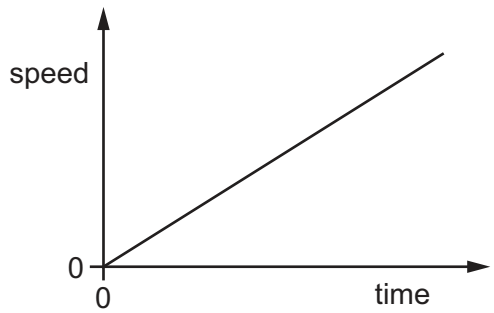
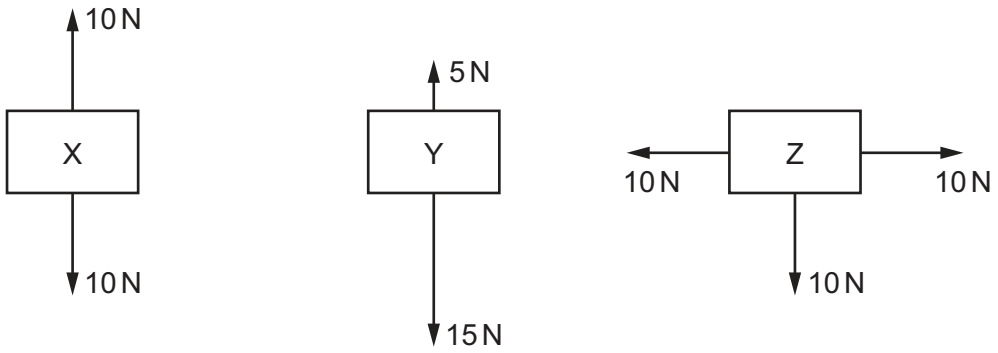


28 A car travels at constant speed. It is at point X at time = 0.

Which distance–time graph and speed–time graph represent the motion of the car?

	distance–time graph	speed–time graph
A		
B		
C		
D		

29 The diagrams show all the forces acting on three objects, X, Y and Z.



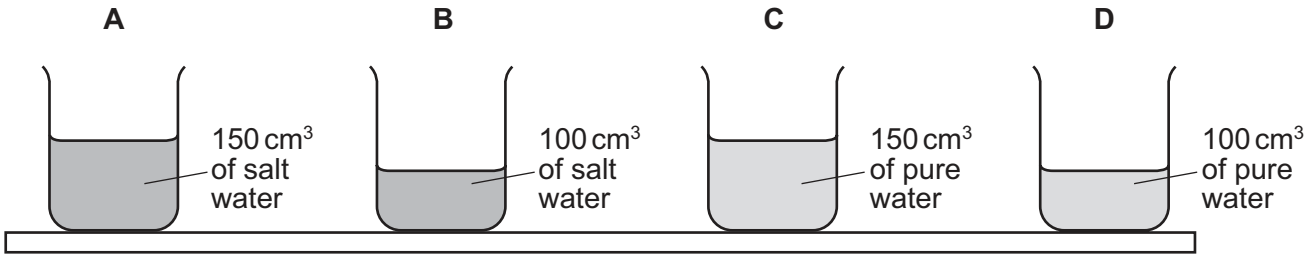
Which of the objects experience a resultant force?

A X, Y and Z **B** X only **C** Y and Z only **D** Y only

30 A student places four identical beakers on a bench.

Two beakers contain salt water of density 1.1 g / cm^3 and two beakers contain pure water of density 1.0 g / cm^3. The quantity of water in each beaker is shown.

Which beaker exerts the greatest pressure on the bench?



31 The power rating of an electric kettle is 1500 W.

What does this mean?

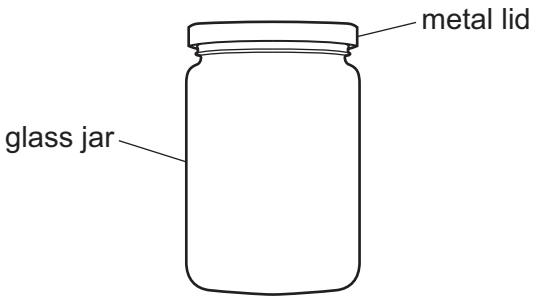
A The kettle requires 1500 J to boil water.

B The kettle takes 1500 s to boil water.

C The kettle transfers 1500 J of energy every second.

D The weight of the kettle is 1500 N.

32 A glass jar in a warm room has a metal lid that is easy to remove.



The jar with the lid on is left in a refrigerator overnight.

In the morning, the lid of the jar is difficult to remove.

Which statement is an explanation of what happens when the jar is in the refrigerator?

A The glass jar contracted more than the metal lid.

B The metal lid contracted more than the glass jar.

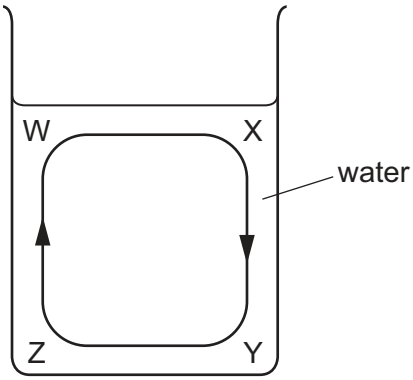
C The glass jar expanded more than the metal lid.

D The metal lid expanded more than the glass jar.

33 A beaker contains water that is all at 20 °C.

A convection current is started in the water, as shown in the diagram.

Four points are labelled W, X, Y and Z.



Which two actions can each, on their own, cause this convection current?

A cooling the water at W or heating the water at Y

B cooling the water at W or heating the water at Z

C cooling the water at X or heating the water at Y

D cooling the water at X or heating the water at Z

34 Which type of electromagnetic wave is emitted by a television remote controller?

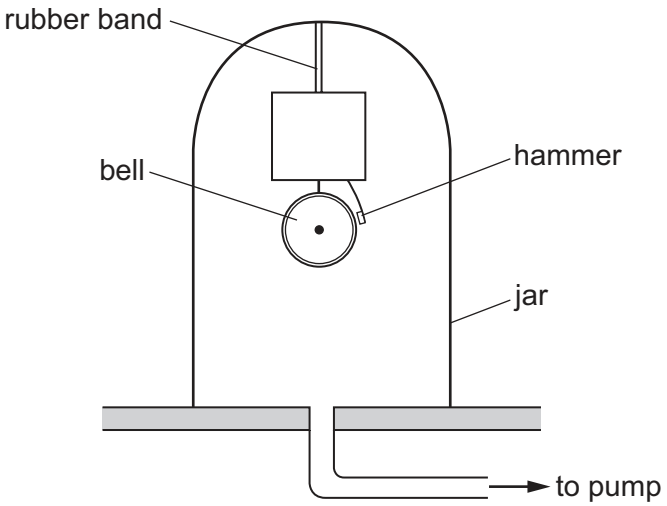
A gamma (γ)-rays

B infrared

C ultraviolet

D X-rays

35 An electric bell is suspended by a rubber band in a glass jar. The hammer hits the bell and makes it ring.



A pump removes air from the jar. The hammer still hits the bell but no sound can be heard.

Why does this happen?

A A medium is needed to transmit sound waves.

B The bell cannot vibrate in a vacuum.

C The pitch of the sound is now outside the range of human hearing.

D There cannot be an electric current in a vacuum.

36 A cell is connected in a circuit.

Which statement describes how the electromotive force (e.m.f.) of the cell is measured?

A It is measured in newtons using a newton meter connected in parallel with the cell.

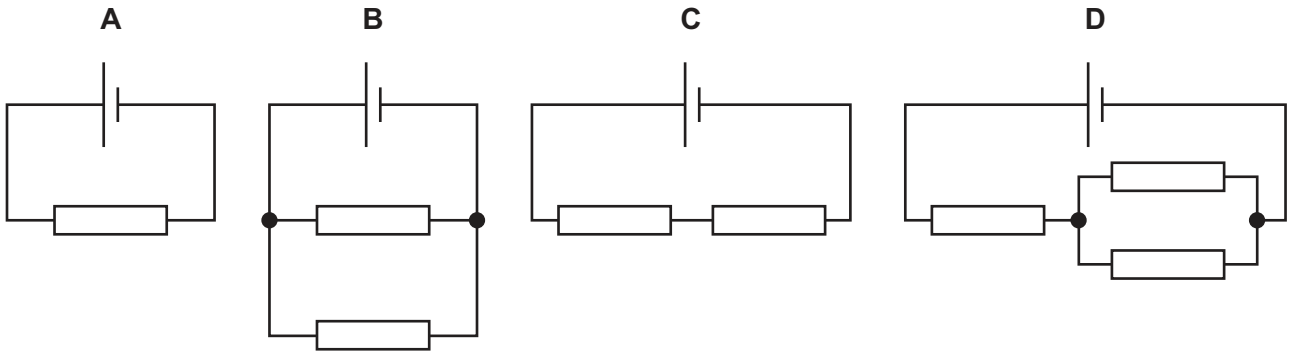
B It is measured in newtons using a newton meter connected in series with the cell.

C It is measured in volts using a voltmeter connected in parallel with the cell.

D It is measured in volts using a voltmeter connected in series with the cell.

37 In the circuits shown, all the resistors are identical.

Which circuit has the smallest combined resistance?



38 The maximum current in an electric circuit is 10 A.

What is the most appropriate rating of a fuse for this circuit?

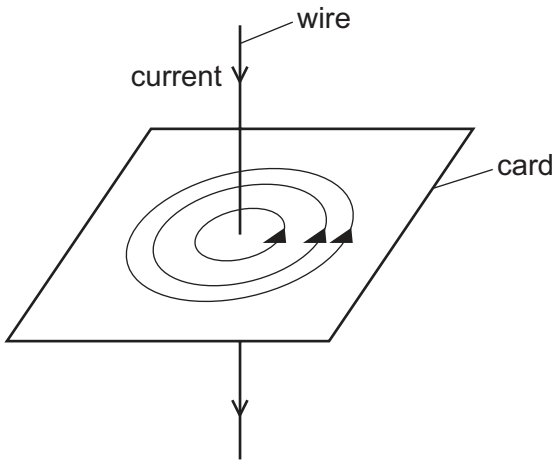
A 5 A **B** 9 A **C** 13 A **D** 25 A

39 A current-carrying wire passes through a flat card.

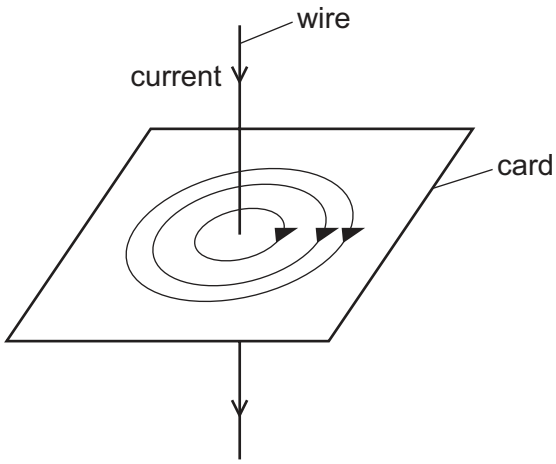
The arrow on the wire shows the direction of the current.

Which diagram shows the pattern of the magnetic field on the card and the direction of the magnetic field lines?

A



B



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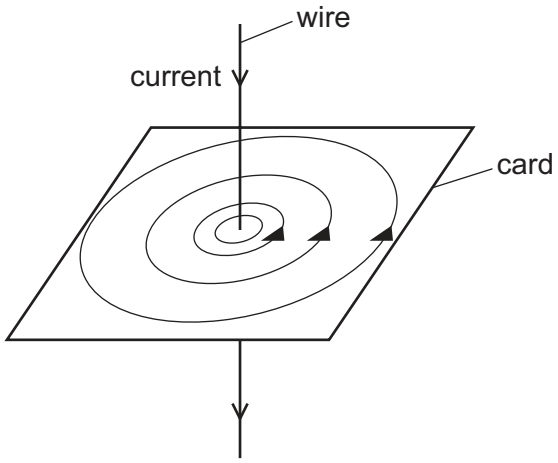

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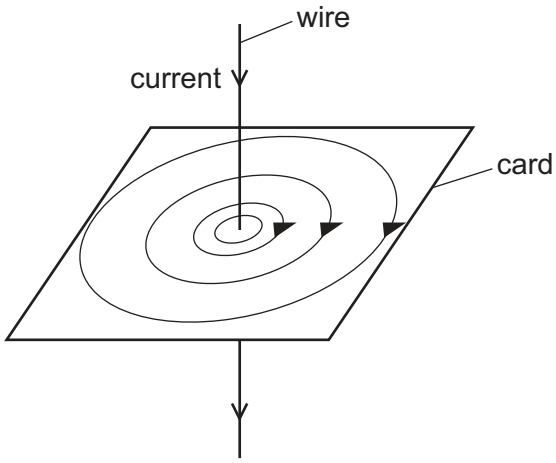

40 A radioactive material has a half-life of 4.0 days. The rate of emission of radiation from a sample of the material is 32 emissions per minute.

What was the rate of emission from the sample 8.0 days **earlier**?

A 8.0 emissions per minute

B 128 emissions per minute

C 256 emissions per minute

D 1024 emissions per minute

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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 –	113 Nh nihonium –	114 Fl flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessine –	118 Og oganesson –

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.).