Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/13**

Paper 1 Multiple Choice (Core) **October/November 2019**

45 minutes

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

* 8 9 8 4 9 6 3 9 6 9 *

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.
Electronic calculators may be used.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / s^2).

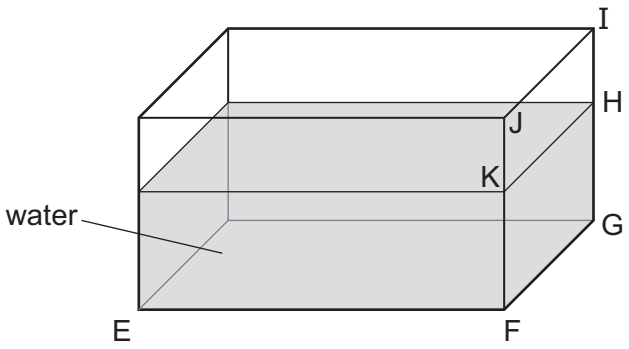
This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **15** printed pages and **1** blank page.

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1 A student uses a ruler to find the volume of water in a tank.

She measures the lengths EF and FG.



What other length does she need to measure?

A FJ **B** FK **C** HI **D** IJ

2 An object begins to fall close to the Earth's surface. Air resistance can be ignored.

Which statement about the object's acceleration is correct?

A The acceleration is constant.

B The acceleration decreases as the body falls.

C The acceleration increases as the body falls.

D The acceleration is zero.

3 A car travels at an average speed of 60 km / h for 15 minutes.

How far does the car travel in 15 minutes?

A 4.0 km **B** 15 km **C** 240 km **D** 900 km

4 Which equation shows the relationship between the weight W and the mass m of an object?

A $W = \frac{m}{g}$

B $W = mg$

C $W = m + g$

D $W = \frac{g}{m}$

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5 Four hollow glass spheres P, Q, R and S each have a mass of 72 g.

Their volumes are given in the table.

	volume / cm^3
P	55
Q	65
R	75
S	85

Which spheres sink in a liquid of density 0.9 g / cm^3?

A P, Q and R **B** Q, R and S **C** R and S only **D** S only

6 A student measures the length of a spring. She then attaches different weights to the spring. She measures the length of the spring for each weight.

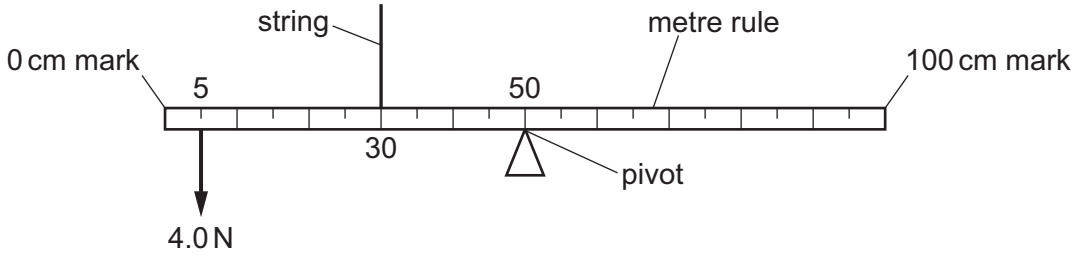
The table shows her results.

weight / N	length / mm
0	520
1.0	524
2.0	528
3.0	533
4.0	537
5.0	540

What is the extension of the spring with a weight of 3.0 N attached to it?

A 4 mm **B** 5 mm **C** 12 mm **D** 13 mm

7 The diagram shows a uniform metre rule. The rule is pivoted at its mid-point. A downward force of 4.0 N acts on the rule at the 5 cm mark. The rule is held by a string at the 30 cm mark. The rule is in equilibrium.



What is the upward force that the string exerts on the rule?

A 0.67 N **B** 4.0 N **C** 6.0 N **D** 9.0 N

8 The diagrams represent the only two forces acting on an object.

Which object could be moving to the right at constant speed?

A



B



C



D



9 Brakes are used to slow down a moving car.

Into which form of energy is most of the kinetic energy converted as the car slows down?

A chemical

B elastic

C thermal

D sound

10 Three situations are listed.

1 someone blowing air into a party balloon

2 a crane lifting a block of concrete

3 a pile of books at rest on a shelf

In which situations is work being done?

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

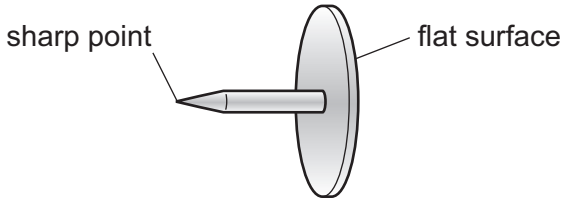
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11 A boy lifts a brick from the ground and places it at rest on a higher shelf. He does 30 J of work against gravity.

Which row correctly describes the final energies of the brick?

	gravitational potential energy gained by the brick / J	kinetic energy gained by the brick / J
A	0	30
B	15	15
C	30	0
D	27	3

12 A drawing pin (thumb tack) has a sharp point at one end and a flat surface at the other end.



The pin is pushed into a wooden board.

How do the pressure and the force at the sharp point compare with the pressure and the force on the flat surface?

	force at the sharp point	pressure at the sharp point
A	greater than on the flat surface	greater than on the flat surface
B	greater than on the flat surface	less than on the flat surface
C	the same as on the flat surface	greater than on the flat surface
D	the same as on the flat surface	less than on the flat surface

13 Pressure is related to force and area.

Which situation **cannot** be explained using this relationship?

A Using a longer spanner than normal to undo a tight nut.

B Hammering a nail into a piece of wood.

C Tractors using wide tyres in a muddy field.

D A sharp kitchen knife cutting vegetables more easily than a blunt one.

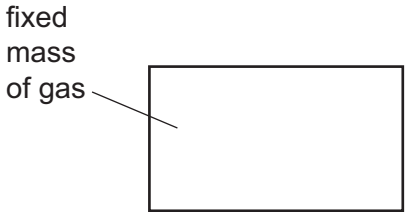
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[Turn over

14 Which row compares the separation and the motion of the molecules of a hot gas with those of a cool liquid? (Both the gas and the liquid are at the same pressure.)

	separation	motion
A	greater for a gas	faster for a gas
B	greater for a gas	slower for a gas
C	smaller for a gas	faster for a gas
D	smaller for a gas	slower for a gas

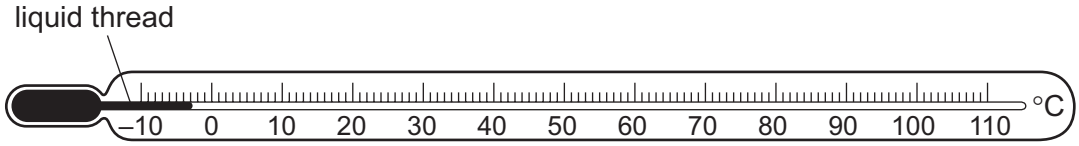
15 A fixed mass of gas is trapped in a container. The temperature of the gas is increased but the volume of the gas is kept constant.



How does this change affect the kinetic energy of the molecules and the pressure on the walls of the container?

	kinetic energy	pressure
A	increases	increases
B	stays the same	increases
C	increases	decreases
D	decreases	increases

16 The diagram shows a liquid-in-glass thermometer.



When the temperature of the thermometer rises, the changes produced cause the liquid thread to move to the right.

Why does this happen when the temperature of the thermometer rises?

A Gases contract and liquids expand.

B Gases contract and solids expand.

C Liquids expand more than gases.

D Liquids expand more than solids.

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17 A liquid-in-glass thermometer has a range from –10 °C to 110 °C.

What are the fixed point temperatures used when calibrating this thermometer in °C?

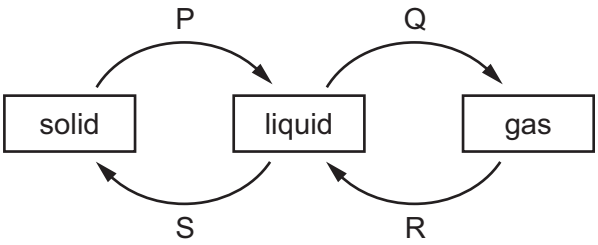
A –10 °C and 0 °C

B –10 °C and 110 °C

C 0 °C and 100 °C

D 0 °C and 110 °C

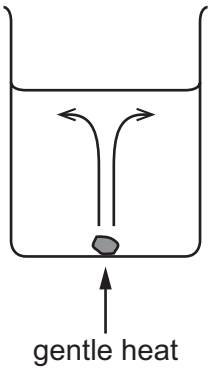
18 The diagram shows four labelled changes of state between solid, liquid and gas.



Which changes need an energy input?

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

19 A beaker contains some cold water. A purple crystal is placed on the bottom of the beaker. The beaker is gently heated beneath the crystal. The crystal dissolves in the water. The colour spreads, as shown in the diagram.



Three students each make a statement about the experiment.

Student 1 says the purple water is less dense than the rest of the water.

Student 2 says the purple water is warmer than the rest of the water.

Student 3 says all of the water will eventually get heated, even though water is a poor conductor of thermal energy.

Which students are correct?

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

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20 Why are the outside walls of houses often painted white in very hot countries?

A White surfaces are good absorbers of infrared radiation.

B White surfaces are good emitters of infrared radiation.

C White surfaces are poor absorbers of infrared radiation.

D White surfaces are poor reflectors of infrared radiation.

21 Which type of wave is **not** an example of a transverse wave?

A sound wave

B microwave

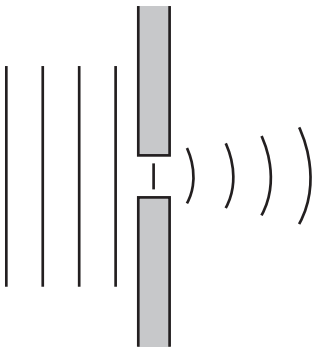
C infrared wave

D radio wave

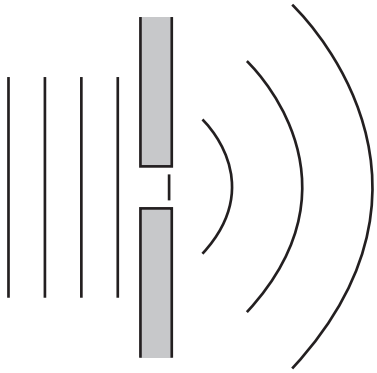
22 Plane water waves approach a narrow gap in a barrier.

Which diagram shows the diffraction pattern that would occur?

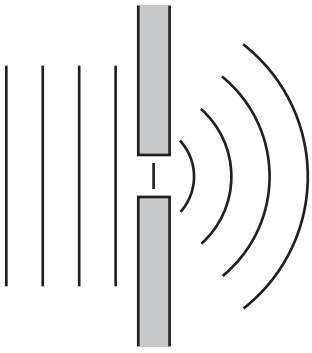
A



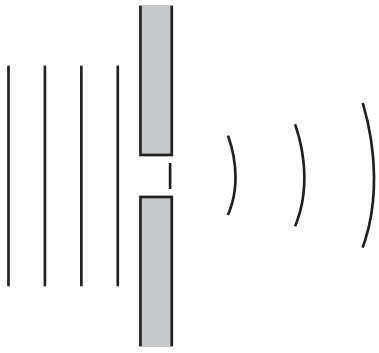
B



C



D



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23 A person stands 1.0 m in front of a plane mirror. The mirror is moved away from the person at a speed of 1.0 m / s.

Which statement is correct?

A The image moves away from the person at a speed of 1.0 m / s.

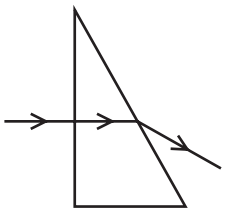
B The image moves away from the person at a speed of 2.0 m / s.

C The image moves towards the person at a speed of 1.0 m / s.

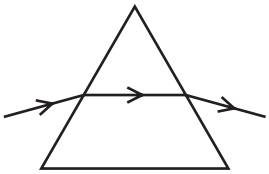
D The image moves towards the person at a speed of 2.0 m / s.

24 Which diagram shows total internal reflection of light by a glass prism?

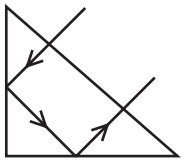
A



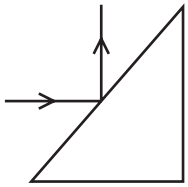
B



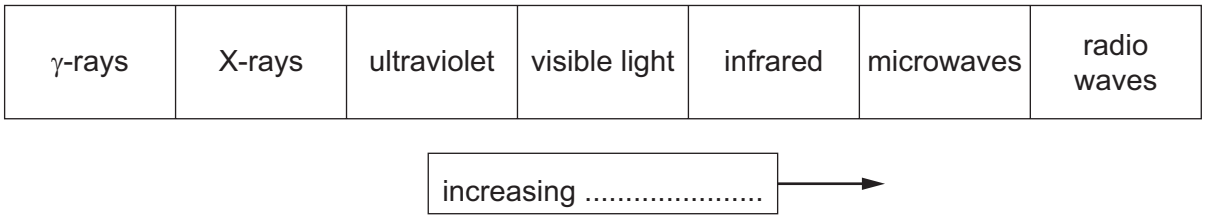
C



D



25 The diagram shows the electromagnetic spectrum.



A word is missing from the label below the spectrum.

Which word is missing?

A amplitude

B frequency

C speed

D wavelength

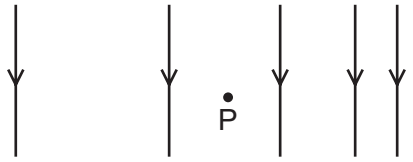
26 A man hears a starting pistol fire 1.5 seconds after he sees a puff of smoke from the pistol. The sound and the smoke are made at the same time. The starting pistol is 450 metres away from the man.

What is the speed of sound calculated from this observation?

A 150 m / s **B** 300 m / s **C** 330 m / s **D** 625 m / s

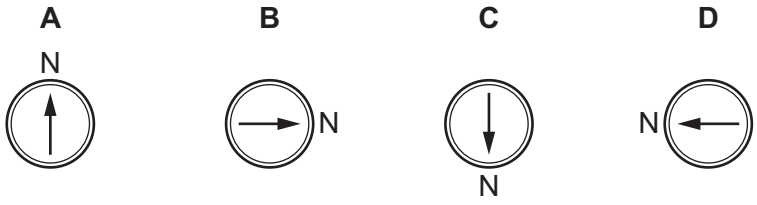
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27 The diagram represents a magnetic field. The field increases in strength from left to right.

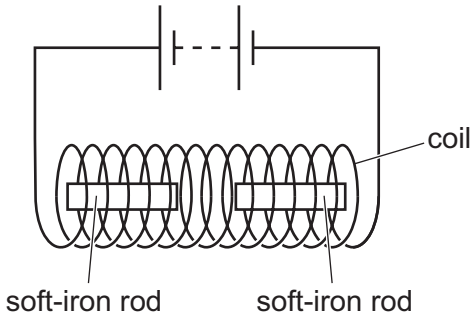


A small compass is placed at P.

Which way will the compass needle point?



28 Two soft-iron rods are placed end-to-end inside a coil. The coil is connected to a battery.



The connections from the battery to the coil are now reversed.

What happens to the soft-iron rods in each case?

	battery connections as shown	battery connections reversed
A	rods attract	rods attract
B	rods attract	rods repel
C	rods repel	rods attract
D	rods repel	rods repel

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29 A plastic rod is rubbed with a dry cloth. The rod becomes positively charged.

Why has the rod become positively charged?

A It has gained electrons.

B It has gained neutrons.

C It has lost electrons.

D It has lost neutrons.

30 A resistor is connected to a battery. There is a current in the resistor.

What is the main energy change?

A Chemical energy is converted into thermal energy.

B Chemical energy is converted into gravitational potential energy.

C Nuclear energy is converted into thermal energy.

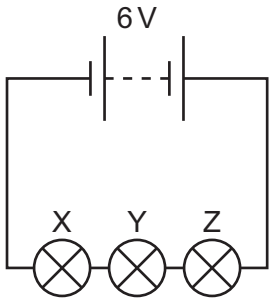
D Nuclear energy is converted into gravitational potential energy.

31 Lamps X and Y are designed to operate at normal brightness when each are connected to a 3.0 V supply.

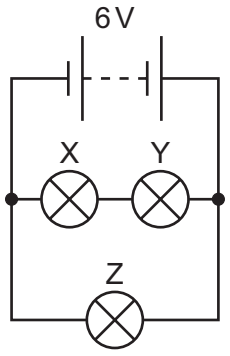
Lamp Z is designed to operate at normal brightness when connected to a 6.0 V supply.

In which circuit do all three lamps operate at normal brightness?

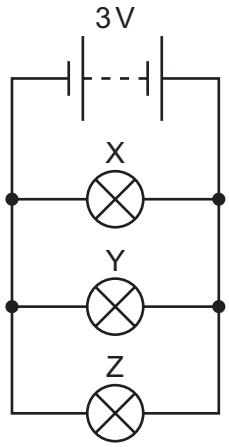
A



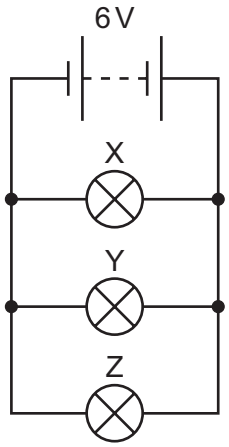
B



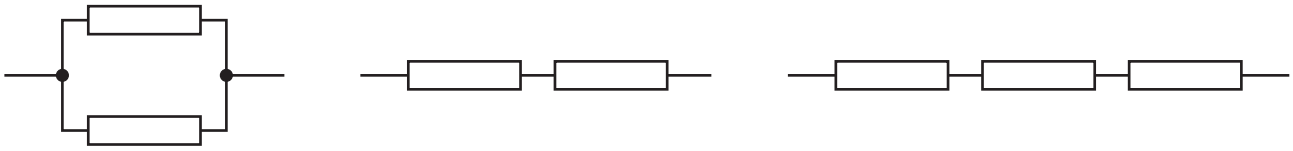
C



D



32 Identical resistors are connected together to form arrangements X, Y and Z.



X Y Z

What is the correct order of the resistances of the arrangements from the largest to the smallest?

A X → Y → Z

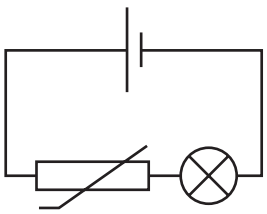
B Y → X → Z

C Z → X → Y

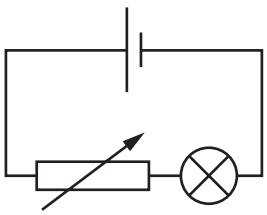
D Z → Y → X

33 Which circuit shows a variable resistor used to control the brightness of a lamp?

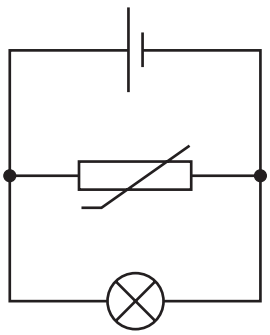
A



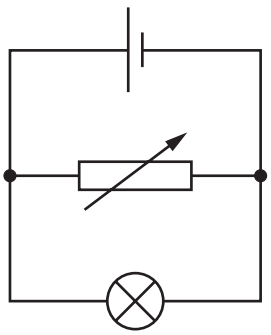
B



C



D



34 Where must a fuse be connected in a mains electric circuit?

A the earth wire only

B the live wire only

C the neutral wire only

D the live wire and the earth wire

35 A step-up transformer produces a 60 V a.c. output from a 12 V a.c. input.

There are 50 turns on the secondary coil.

How many turns are there on the primary coil?

A 5 **B** 10 **C** 50 **D** 250

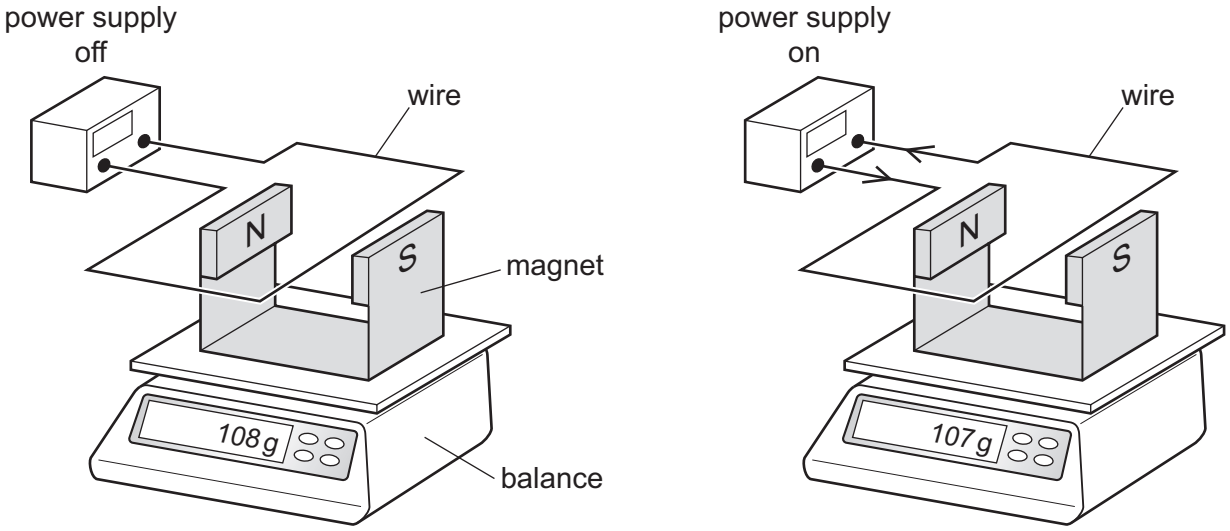
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36 A student uses a balance, a magnet and a power supply to determine the force on a wire in a magnetic field.

The wire is held between the poles of the magnet.

The student switches on the power supply.

The diagrams show the readings with and without a current in the wire.



no current in wire

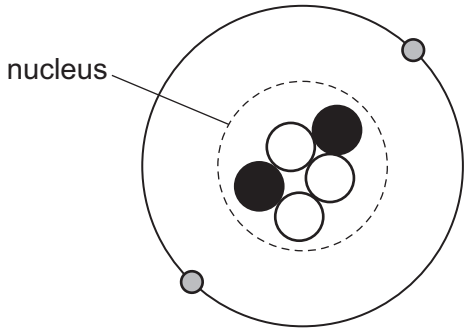
current in wire

The student reverses the current in the wire. The magnitude of the current does not change.

What is the new reading on the balance?

A 106 g **B** 107 g **C** 108 g **D** 109 g

37 The diagram represents a neutral atom.



Which row identifies each type of particle in the diagram?

	●	○	●
A	electron	neutron	proton
B	electron	proton	neutron
C	neutron	electron	proton
D	proton	electron	neutron

38 An iron nuclide is represented by the symbol shown.

$$^{56}_{26}\mathrm{Fe}$$

Which statements about a nucleus of this iron nuclide are correct?

1 The nucleus contains 56 neutrons.

2 The nucleon number is 30.

3 The proton number is 26.

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

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39 Three types of radiation that can cause ionisation are α-, β- and γ-radiation.

Which row identifies the least and the most ionising of these radiations?

	least ionising	most ionising
A	α	β
B	α	γ
C	γ	β
D	γ	α

40 Why are some radioactive sources stored in boxes made from lead?

A Lead absorbs emissions from the radioactive sources.

B Lead decreases the half-life of radioactive sources.

C Lead increases the half-life of radioactive sources.

D Lead repels emissions from the radioactive sources.

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