Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/12**

Paper 1 Multiple Choice (Core) **October/November 2023**

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.
- Take the weight of 1.0 kg to be 9.8 N (acceleration of free fall = 9.8 m / s^2).

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.

IB23 11_0625_12/4RP

[Turn over

1 A student investigates the oscillation of a mass suspended from a spring.

The student pulls the mass down from its rest position P and then releases it so that it oscillates vertically.

The student then follows the instructions listed to find the period of the oscillating mass.

1 Count 10 complete oscillations.

2 Divide the time on the stop-watch by 10.

3 Start the stop-watch as the mass passes upwards through point P.

4 Stop the stop-watch.

What is the correct order of these instructions?

A $1 \rightarrow 3 \rightarrow 4 \rightarrow 2$

B $3 \rightarrow 1 \rightarrow 4 \rightarrow 2$

C $3 \rightarrow 4 \rightarrow 1 \rightarrow 2$

D $4 \rightarrow 3 \rightarrow 2 \rightarrow 1$

2 A student measures the average speed of a cyclist in a race.

Which quantities must she measure?

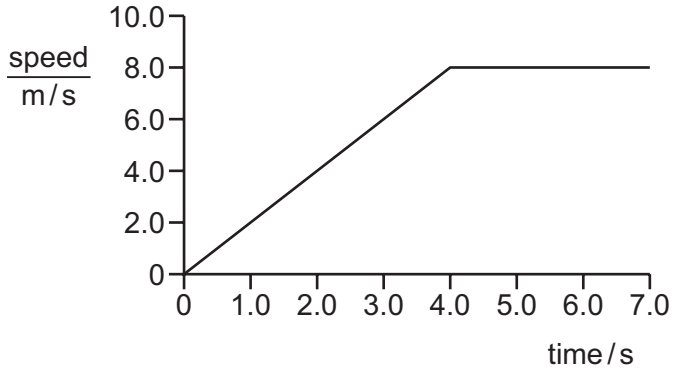
A the total time taken to complete the race and the time taken for the cyclist to reach her highest speed

B the total time taken to complete the race and the total distance travelled by the cyclist at her highest speed

C the total time taken to complete the race and the total distance travelled by the cyclist

D the time taken to reach her highest speed and the total distance travelled by the cyclist

3 The graph shows the motion of a sprinter.



She accelerates steadily from rest to 8.0 m/s in 4.0 s.

How far does she travel in the last three seconds of her acceleration?

A 9.0 m **B** 15 m **C** 16 m **D** 24 m

4 A person steps onto a bathroom scale.

The bathroom scale records both mass and weight.

Which row shows the readings on the bathroom scale?

	mass	weight
A	60 N	590 kg
B	60 kg	590 N
C	590 kg	60 N
D	590 N	60 kg

5 Which equation is correct?

A density = mass × volume

B density = weight × volume

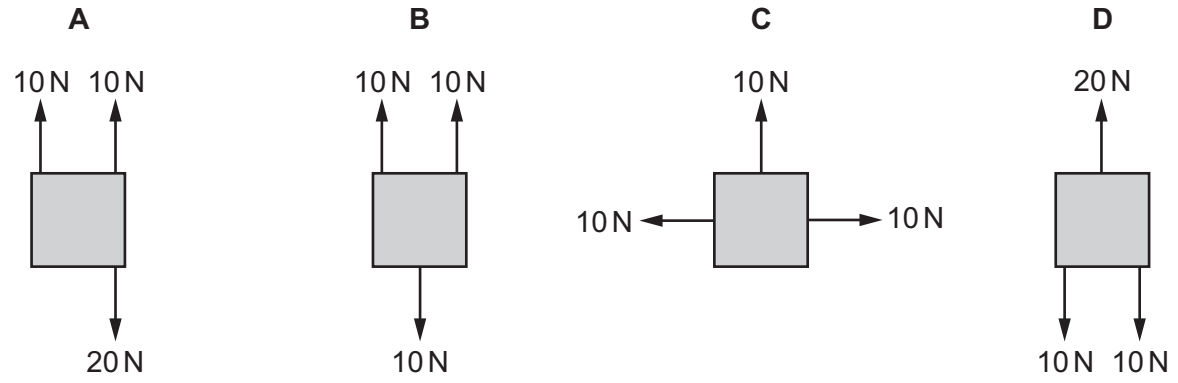
C mass = density × volume

D weight = density × volume

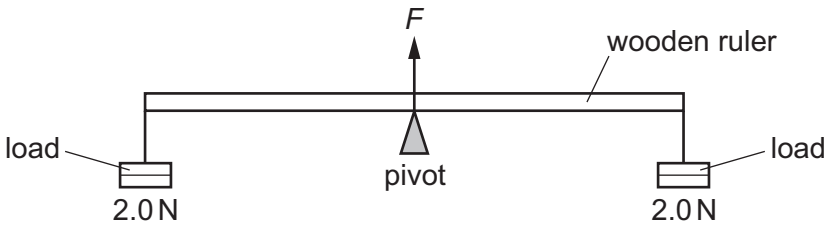
[Turn over

6 The diagrams show four identical objects. Each object is acted on by only the forces shown.

Which diagram shows an object in equilibrium?



7 A uniform wooden ruler is pivoted at its centre. A load of 2.0 N is suspended from each end of the ruler.



The pivot exerts an upward force *F* on the ruler.

What is *F* equal to?

A 2.0 N

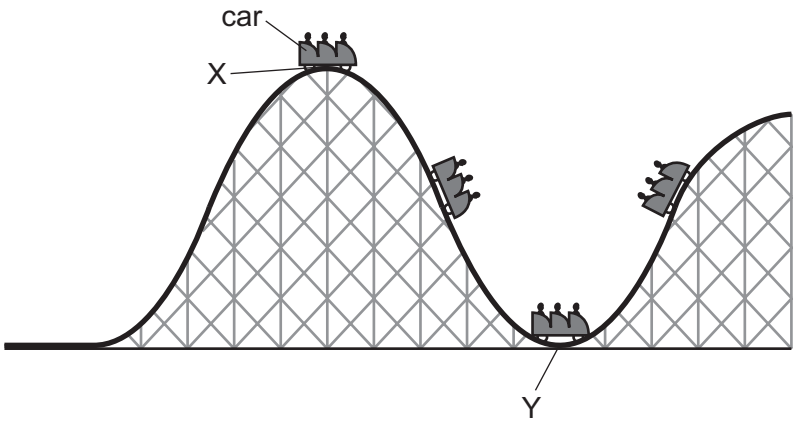
B the weight of the ruler

C 4.0 N

D 4.0 N plus the weight of the ruler

8 The diagram shows part of a rollercoaster ride with the car at different positions.

The car runs freely down from position X to position Y and up the hill on the other side.



What happens to the energy in the kinetic store and the gravitational potential store of the car as it moves from position X to position Y?

	energy in kinetic store	energy in gravitational potential store
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

9 In a small power station, biofuel is used to generate electricity.

Which energy store is reduced by this process?

A chemical

B kinetic

C nuclear

D thermal

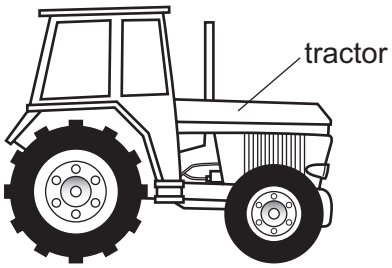
10 An electric car is charged overnight. In 8.0 hours, 180 MJ of energy is transferred.

What is the power of the charger?

A 6.3 kW **B** 380 kW **C** 23 MW **D** 1400 MW

[Turn over

11 Tractors have large tyres. These help to prevent the wheels from sinking into soft ground.



Which statement explains this?

A Larger tyres exert a greater force on the ground.

B Larger tyres exert a greater pressure on the ground.

C Larger tyres exert a smaller force on the ground.

D Larger tyres exert a smaller pressure on the ground.

12 Brownian motion is the random motion of particles.

In which states of matter is Brownian motion observed?

A gases, liquids and solids

B gases and liquids only

C gases and solids only

D liquids and solids only

13 A student investigates the relationship between the pressure of a gas and its volume at constant temperature. He records his results in the table.

reading	pressure / N / cm^2	volume / cm^3
1	10.0	24
2	7.4	32
3	4.0	63
4	13.0	19

What is the correct conclusion from the experiment?

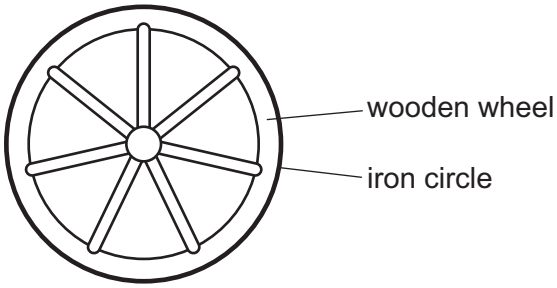
A The volume decreases when the pressure increases.

B The volume increases when the pressure increases.

C The volume initially increases when the pressure increases, but then decreases.

D The volume is independent of the pressure.

14 A wooden wheel can be strengthened by putting a tight circle of iron around it.



Which action would make it easier to fit the circle over the wood?

A cooling the iron circle only

B heating the iron circle

C heating the wooden wheel and cooling the iron circle

D heating the wooden wheel but not heating or cooling the iron circle

15 Which diagram shows the processes happening during changes of state?

A

gas —boiling→ liquid —solidification→ solid

B

gas —condensation→ liquid —melting→ solid

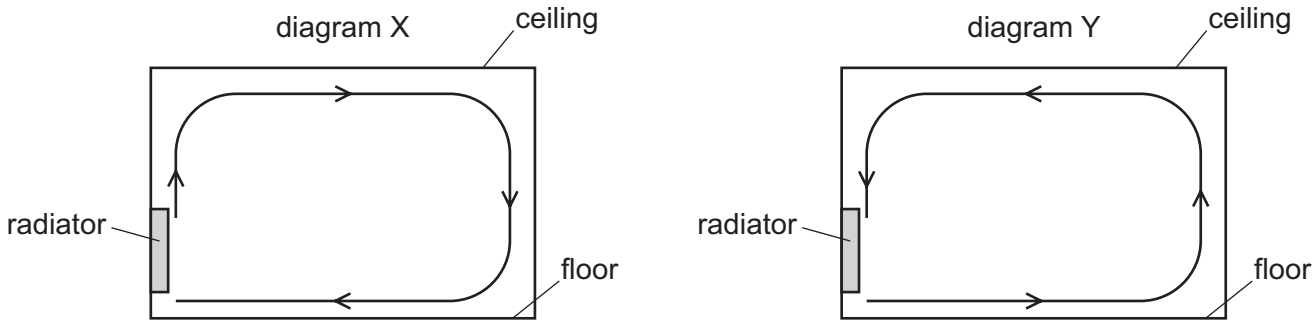
C

solid —melting→ liquid —boiling→ gas

D

solid —solidification→ liquid —boiling→ gas

16 A room is heated by a radiator. The diagrams X and Y show two possible circulations of hot air, which heat the room.



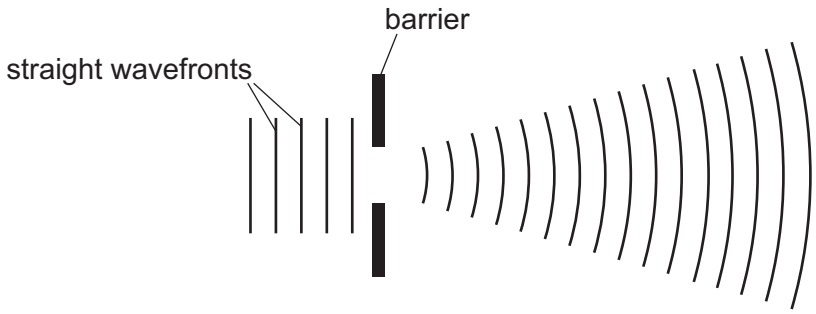
Which diagram and reason explain the heating of the room by convection?

	diagram	reason
A	X	air density decreases when air is heated
B	X	air density increases when air is heated
C	Y	air density decreases when air is heated
D	Y	air density increases when air is heated

17 Which description and example are correct for a transverse wave?

	description	example
A	The direction of vibration is parallel to the direction of propagation.	sound
B	The direction of vibration is parallel to the direction of propagation.	waves on a rope
C	The direction of vibration is at right angles to the direction of propagation.	sound
D	The direction of vibration is at right angles to the direction of propagation.	waves on a rope

18 Straight wavefronts on the surface of a ripple tank approach a gap in a barrier. The diagram shows how the wavefronts change shape as they pass through the gap.



What is the name of this effect?

A diffraction

B propagation

C reflection

D refraction

19 Red, green and violet lights are part of the visible spectrum of light.

What is the order of colours from shortest to longest wavelength?

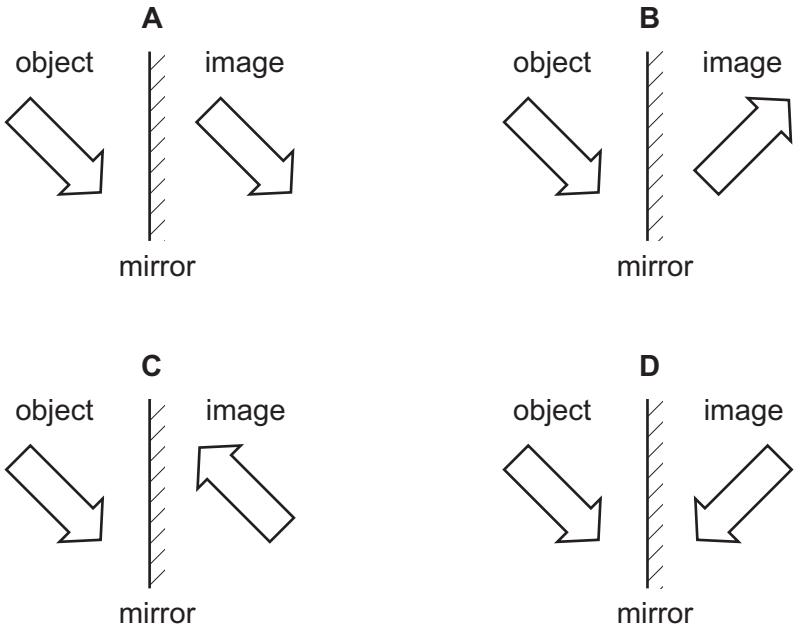
A red → green → violet

B red → violet → green

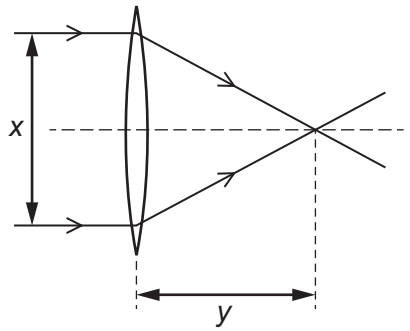
C violet → red → green

D violet → green → red

20 Which diagram shows the image correctly formed by reflection?



21 A student passes parallel rays of light through four different converging lenses. He measures the distance *x* and the distance *y* for each experiment.



Which lens has the longest focal length?

	x / cm	*y* / cm
A	4.6	2.0
B	5.1	3.1
C	5.9	2.3
D	6.1	2.4

22 The table shows different types of wave in the electromagnetic spectrum.

radio waves	microwaves	infrared waves	visible light	ultraviolet waves	X-rays	gamma rays

Where do all the waves travel at the same speed?

A in a vacuum

B in diamond

C in glass

D in water

23 Which statement about a sound that can be heard by a person with normal hearing is correct?

A The sound is a longitudinal wave with a frequency between 2.0 Hz and 20 Hz.

B The sound is a longitudinal wave with a frequency between 20 Hz and 20 000 Hz.

C The sound is a transverse wave with a frequency between 2.0 Hz and 2000 Hz.

D The sound is a transverse wave with a frequency between 2.0 Hz and 20 MHz.

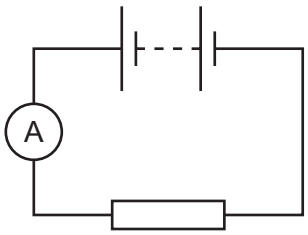
24 A hard magnetic material can be used to make a permanent magnet.

A soft magnetic material can be used to make a temporary magnet.

Which row shows whether iron and steel are hard or soft magnetic materials?

	iron	steel
A	hard	hard
B	hard	soft
C	soft	hard
D	soft	soft

25 A battery is connected to an ammeter and a resistor.



The ammeter reading is 0.20 A.

An electrical insulator is connected in parallel with the resistor.

What is the ammeter reading?

A 0 A

B between 0 A and 0.20 A

C 0.20 A

D greater than 0.20 A

26 Which unit is used to measure electromotive force (e.m.f.)?

A ampere

B joule

C volt

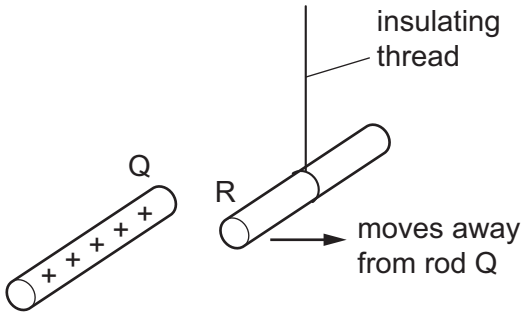
D watt

27 Which equation is correct for resistance R, potential difference (p.d.) V and current I?

A $R = \frac{V}{I}$ **B** $R = V + I$ **C** $R = \frac{I}{V}$ **D** $R = V \times I$

[Turn over

28 In the diagram, rod R is suspended from an insulating thread.



When the positively charged rod Q is brought close to rod R, rod R moves away from rod Q.

Which conclusion can be made from this observation?

A Rod R is charged, but it is not possible to identify the sign of the charge.

B Rod R must be positively charged.

C Rod R must be negatively charged.

D Rod R is uncharged.

29 In which heating system circuit would thermistors **not** be useful?

A to keep different rooms at different temperatures

B to turn an alarm on if the system overheats

C to turn a heating system off at a particular temperature

D to turn a heating system on when a sound is detected

30 Which statement is correct?

A A fuse is included in a circuit to prevent the current becoming too high.

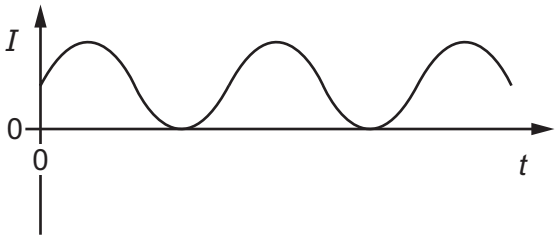
B A fuse should be connected to the neutral wire in a plug.

C An electric circuit will only work if it includes a fuse.

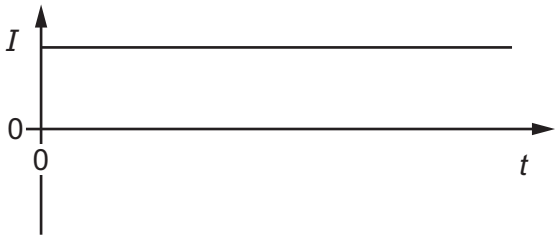
D An earth wire is needed to prevent the fuse blowing.

31 Which graph of current I against time t represents an alternating current (a.c.)?

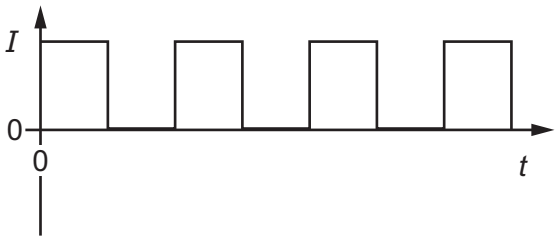
A



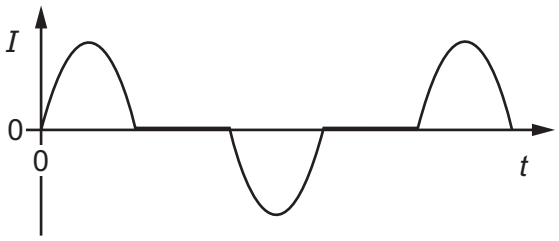
B



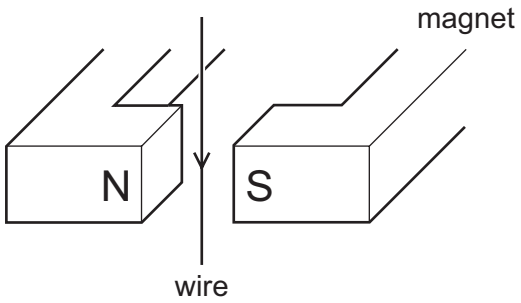
C



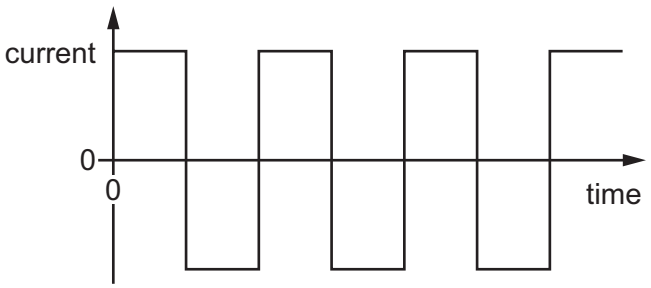
D



32 The diagram shows a wire in the magnetic field between two poles of a magnet.



The current in the wire repeatedly changes between a constant value in one direction and a constant value in the opposite direction, as shown in the graph.



What is the effect on the wire?

A The force on the wire alternates between one direction and the opposite direction.

B The force on the wire is constant in size and direction.

C There is no force acting on the wire at any time.

D There is only a force on the wire when the current reverses.

[Turn over

33 A transformer has N_p turns on its primary coil and N_s turns on its secondary coil. The voltage across the primary coil is V_p and the voltage across the secondary coil is V_s.

What is the relationship between these four quantities?

A $V_p \times V_s = N_p \times N_s$

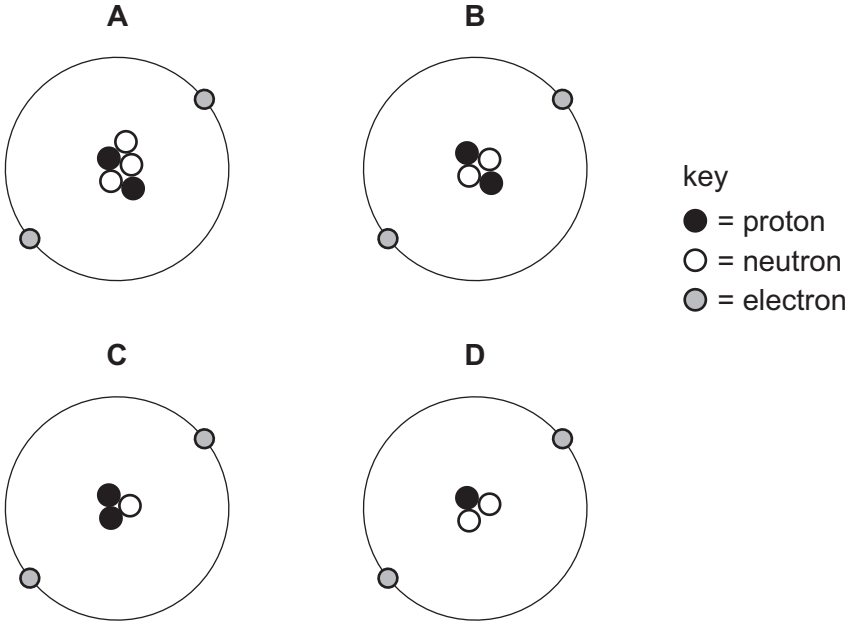
B $\frac{V_p}{V_s} = \frac{N_p}{N_s}$

C $\frac{V_p}{V_s} = \frac{N_s}{N_p}$

D $\frac{V_p}{V_s} = N_p \times N_s$

34 The diagrams represent the protons, neutrons and electrons in different atoms and ions.

Which diagram shows a negatively charged ion?



35 Which row correctly describes an example of radioactive decay?

	original nucleus	emission	change or no change of element
A	stable	γ	change of element
B	unstable	α	change of element
C	unstable	α	no change of element
D	unstable	β	no change of element

36 A detector is used to monitor the emissions from a radioactive source over several days.

The table shows the count rate from the source at different times.

time / days	count rate / counts / s
0	250
1	215
2	180
3	148
4	120
5	100

What is the half-life of the source?

A between 1 and 2 days

B between 2 and 3 days

C between 3 and 4 days

D between 4 and 5 days

37 What is the most effective precaution to reduce the risk when handling, storing or using a radioactive source that emits γ-rays?

A Handle the source for the least possible time.

B Have a fire extinguisher nearby when using the source.

C Store the source at a low temperature.

D Wear plastic safety goggles when handling the source.

38 Approximately how long does the Moon take to orbit the Earth?

A 1 day

B 7 days

C 28 days

D 365 days

[Turn over

39 The Sun transfers energy to the Earth through electromagnetic radiation.

What are two of the parts of the electromagnetic spectrum to which most of the energy belongs?

A gamma rays and X-rays

B infrared radiation and visible light

C microwaves and visible light

D radio waves and microwaves

40 What provides evidence that the Universe is expanding?

A Stars in galaxies outside the Milky Way are all red.

B The Andromeda galaxy is moving toward the Milky Way.

C Light from distant galaxies is shifted to longer wavelengths.

D The Universe is 14 billion years old.