Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/23**

Paper 2 Multiple Choice (Extended) **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.
- 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.

This document has **16** pages. Any blank pages are indicated.

1 A student measures the volume of a small, irregularly shaped stone.

Which apparatus must be used?

A a ruler and a measuring cylinder containing water

B a measuring cylinder containing water only

C a ruler and an empty measuring cylinder

D a ruler only

2 Which quantity is a vector?

A electric field strength

B energy

C mass

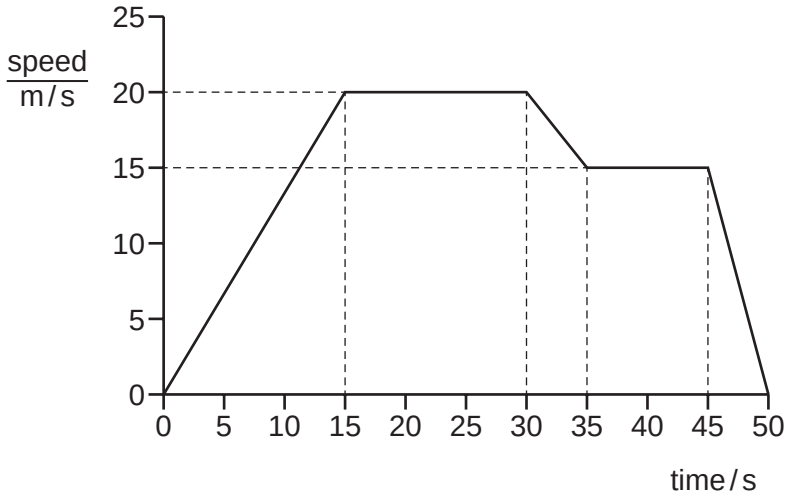
D temperature

3 An athlete runs 2.4 km in 12 minutes.

What is the average speed of the athlete?

A 0.20 m / s **B** 3.3 m / s **C** 29 m / s **D** 200 m / s

4 The graph shows how the speed of a car changes during a period of 50 s.



Which row gives the car's greatest acceleration and the car's greatest deceleration?

	greatest acceleration m/s^2	greatest deceleration m/s^2
A	0.75	1.0
B	0.75	3.0
C	1.3	1.0
D	1.3	3.0

5 Which statement about gravitational field strength g is correct?

A $g = \frac{\text{mass}}{\text{weight}}$

B g = mass × weight

C g is defined as the mass per unit force

D g is equal to the acceleration of free fall

6 Which property of an object **cannot** be changed by applying forces?

A mass

B shape

C speed

D volume

7 A small ball of mass 0.10 kg travels horizontally at a speed of 600 m / s. It strikes a stationary wooden block of mass 1.9 kg resting on a frictionless horizontal surface.

The ball stays in the block.

What is the speed of the ball and the block immediately after the impact?

A 30 m / s **B** 32 m / s **C** 60 m / s **D** 130 m / s

8 An object taken underwater will be damaged if the total pressure acting on it is greater than 2.1 MPa.

What is the maximum depth that the object can be taken underwater before it breaks?

atmospheric pressure = 101 000 Pa

density of water = 1000 kg / m^3

A 10.3 m **B** 204 m **C** 214 m **D** 225 m

9 A piece of solid metal melts to become a liquid.

How do the particles of metal or their behaviour change?

A They increase in size.

B They move around each other.

C They move much further apart.

D They vibrate more about their fixed positions.

10 Brownian motion of particles is observed.

Which statements describe the movement of the particles?

1 The particles all travel along a curved path.

2 The particles move randomly.

3 The particles all travel in the same direction.

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

11 A fixed mass of air in a cylinder is compressed by a piston so that the volume of the air decreases at constant temperature.

How do the air particles now collide with the cylinder walls?

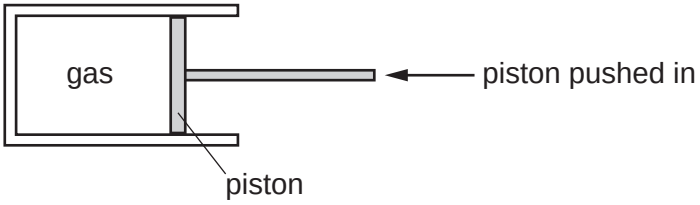
A less often with a greater velocity

B less often with the same velocity

C more often with a greater velocity

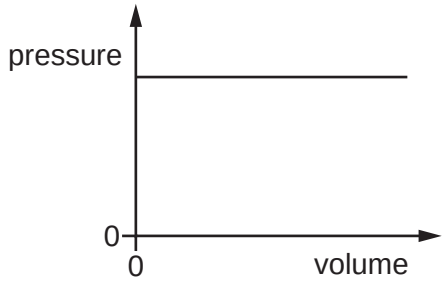
D more often with the same velocity

12 The diagram shows a quantity of gas trapped in a cylinder. The piston is pushed in slowly and the gas is compressed. The temperature of the gas does **not** change.



Which graph shows the relationship between the pressure and the volume of the gas?

A



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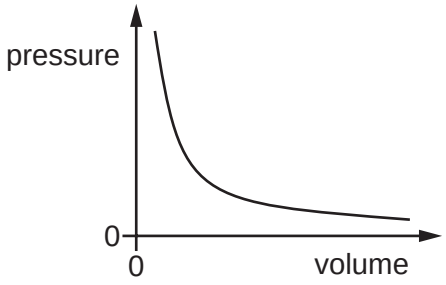

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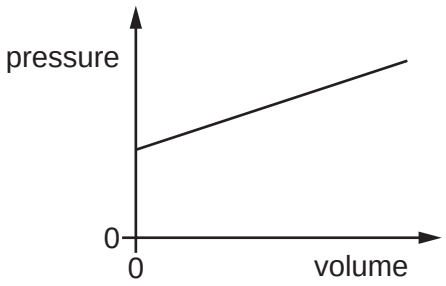

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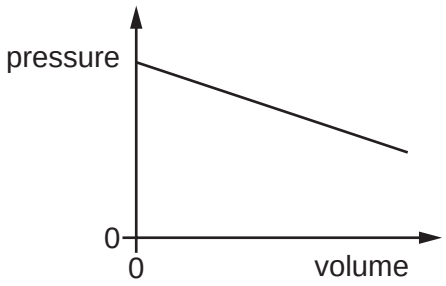


13 The liquid level in a thermometer rises when the thermometer is placed in hot water.

What causes this?

A The liquid contracts.

B The liquid evaporates.

C The liquid expands.

D The liquid freezes.

14 Which statement describes what happens as ice at 0 °C melts to become water?

A Energy is absorbed and the temperature remains constant.

B Energy is absorbed and the temperature rises.

C Energy is released and the temperature remains constant.

D Energy is released and the temperature rises.

15 Which row explains how increasing the surface area of a fixed volume of liquid water and blowing air over the surface speeds up evaporation?

	increasing the surface area	blowing air over the surface
A	increases the total number of water molecules present	increases the energy in the kinetic store of the liquid water
B	increases the total number of water molecules present	removes water molecules from above the surface of the water
C	increases the number of water molecules close to the surface	increases the energy in the kinetic store of the liquid water
D	increases the number of water molecules close to the surface	removes water molecules from above the surface of the water

16 The table shows the state of materials P, Q, R and S, and whether each one contains free electrons.

	gas	liquid	solid	contains free electrons
P	✓	✗	✗	✗
Q	✗	✓	✗	✗
R	✗	✗	✓	✓
S	✗	✗	✓	✗

Using the information in the table, which comparison of the thermal conduction in the materials is correct?

A It is better in P than in Q and S.

B It is better in Q than in R and P.

C It is better in R than in Q and P.

D It is better in S than in R and Q.

17 A seismic wave has a frequency of 5.0 Hz and a speed of 10 km / s.

What is the wavelength of the wave?

A 0.20 km **B** 0.50 km **C** 2.0 km **D** 50 km

18 Sound waves will diffract when going through a gap or passing the edge of a barrier.

Which size of wavelength gives the most diffraction in each case?

	passing through a gap	passing the edge of a barrier
A	small wavelength	small wavelength
B	small wavelength	large wavelength
C	wavelength similar to gap size	small wavelength
D	wavelength similar to gap size	large wavelength

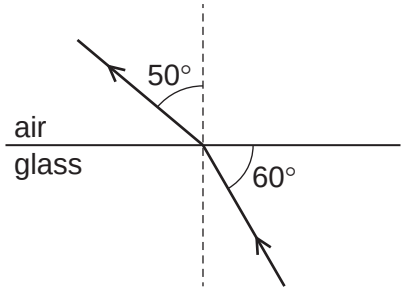
19 A boy is having his eyes tested. A letter is printed on a card placed over his head. He sees the card in a plane mirror placed in front of him.

He sees the letter 'R' in the mirror.

How is it printed on the card?

A R **B** Я **C** Я **D** Я

20 A ray of light is refracted as it enters air from glass, as shown.



What is the speed of light in the glass?

A $2.0 \times 10^8 \text{ m/s}$

B $2.2 \times 10^8 \text{ m/s}$

C $2.3 \times 10^8 \text{ m/s}$

D $2.7 \times 10^8 \text{ m/s}$

21 A converging lens is being used as a magnifying glass.

Which statement is correct?

A The image is further away from the lens than the object is.

B The image is inverted.

C The image is real.

D The object must be placed at the principal focus of the lens.

22 Which colours of visible light are in the correct order of increasing wavelength?

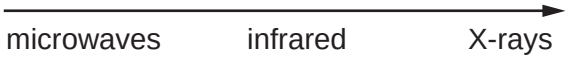
A red → yellow → blue

B orange → green → violet

C indigo → green → red

D blue → green → violet

23 The diagram shows three types of electromagnetic radiation listed in a particular order. The electromagnetic radiation is travelling in a vacuum.



Which quantities increase in magnitude going from left to right across the list?

A both speed and frequency

B frequency only

C speed only

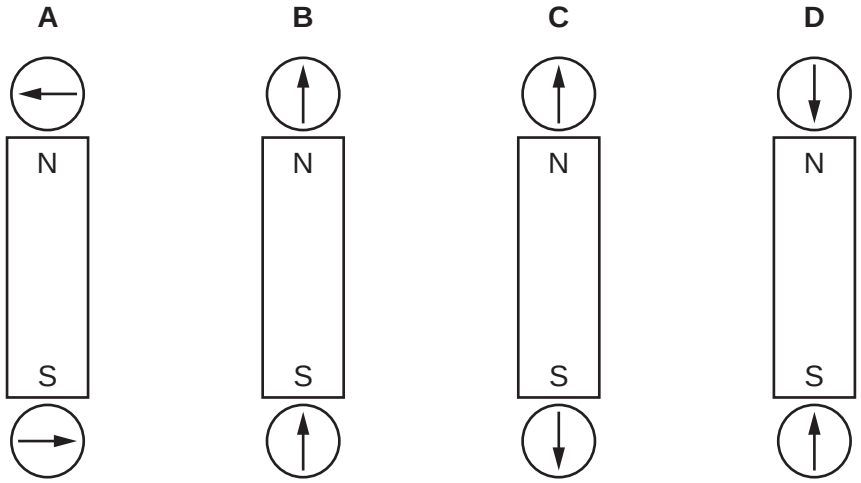
D neither speed nor frequency

24 Which row gives the typical values of the speed of sound at room temperature in the materials stated?

	speed of sound / m/s		
	air	water	iron
A	340	1500	5100
B	340	5100	1500
C	5100	1500	340
D	3.0×10^8	3.0×10^8	3.0×10^8

25 Two small compasses are placed close to a strong bar magnet.

In which directions do the compass needles point?



26 Students are asked for a statement about magnetic fields.

Three statements are listed.

1 A magnetic field is described as a region in which a stationary electric charge experiences a force.

2 The direction of a magnetic field at a point is the direction of the force on an S pole at that point.

3 The relative strength of a magnetic field is shown by the spacing of the magnetic field lines.

Which statements are correct for magnetic fields?

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

27 A student rubs a plastic rod with a cloth.

The rod becomes electrically charged and is attracted by a negatively charged object.

Which statement about the rod is correct?

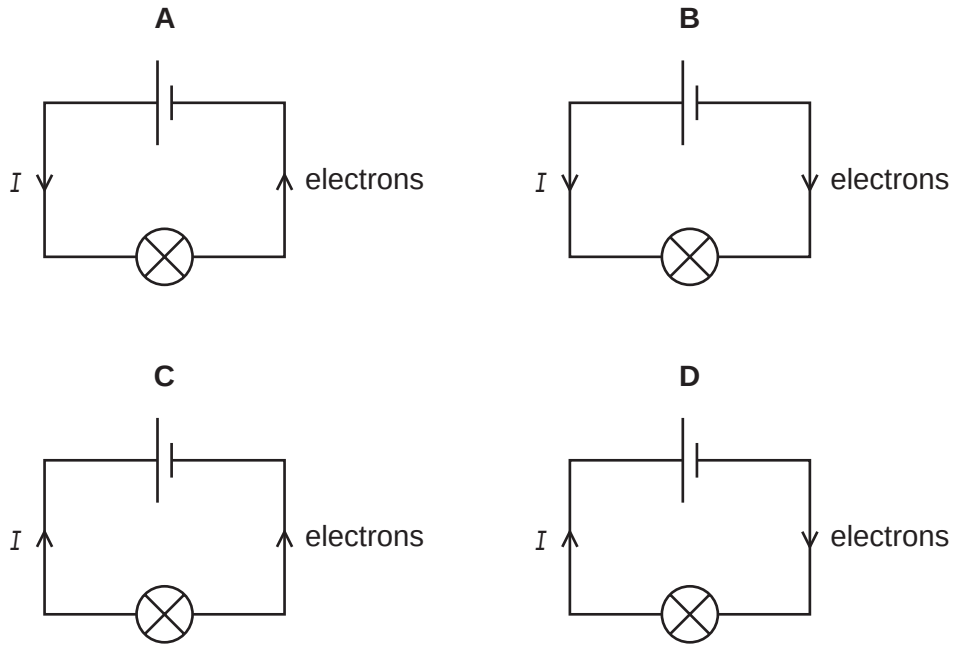
A It is negatively charged because it has gained electrons.

B It is negatively charged because it has lost electrons.

C It is positively charged because it has gained electrons.

D It is positively charged because it has lost electrons.

28 Which circuit shows the directions of the conventional current I and the flow of electrons?



29 A cell has an electromotive force (e.m.f.) of 1.5 V.

How much energy is transferred by the cell when it drives 6.0 C of charge round a complete circuit?

A 4.0 J **B** 4.0 W **C** 9.0 J **D** 9.0 W

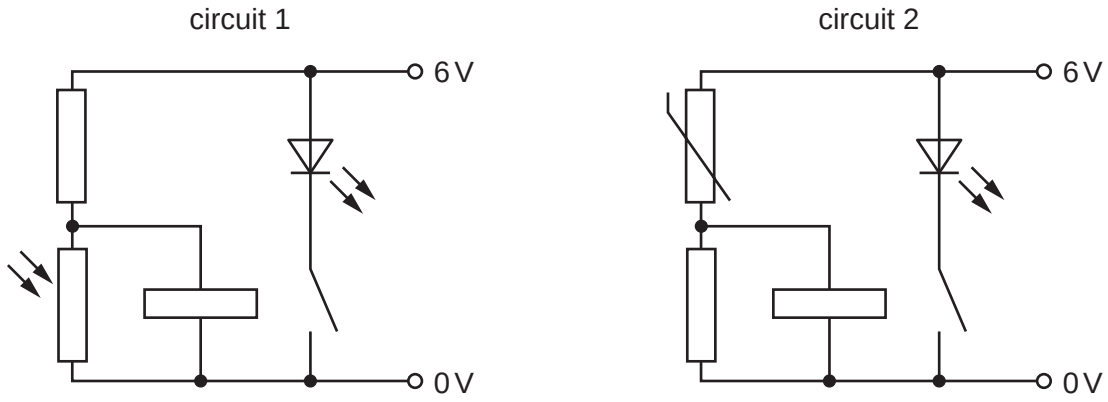
30 A metal resistance wire of length l and cross-sectional area A has resistance R.

What is the resistance of a metal wire of the same material that has length $2l$ and cross-sectional area $\frac{A}{2}$?

A $\frac{R}{4}$ **B** R **C** $2R$ **D** $4R$

31 The diagram shows two circuits.

Each relay is normally open when there is no current in the coil.



Which environmental conditions will cause the light-emitting diodes in circuit 1 and circuit 2 both to emit light?

	temperature	light intensity
A	high	high
B	high	low
C	low	high
D	low	low

32 A transformer is 100% efficient.

Which pair of equations are both valid for the transformer?

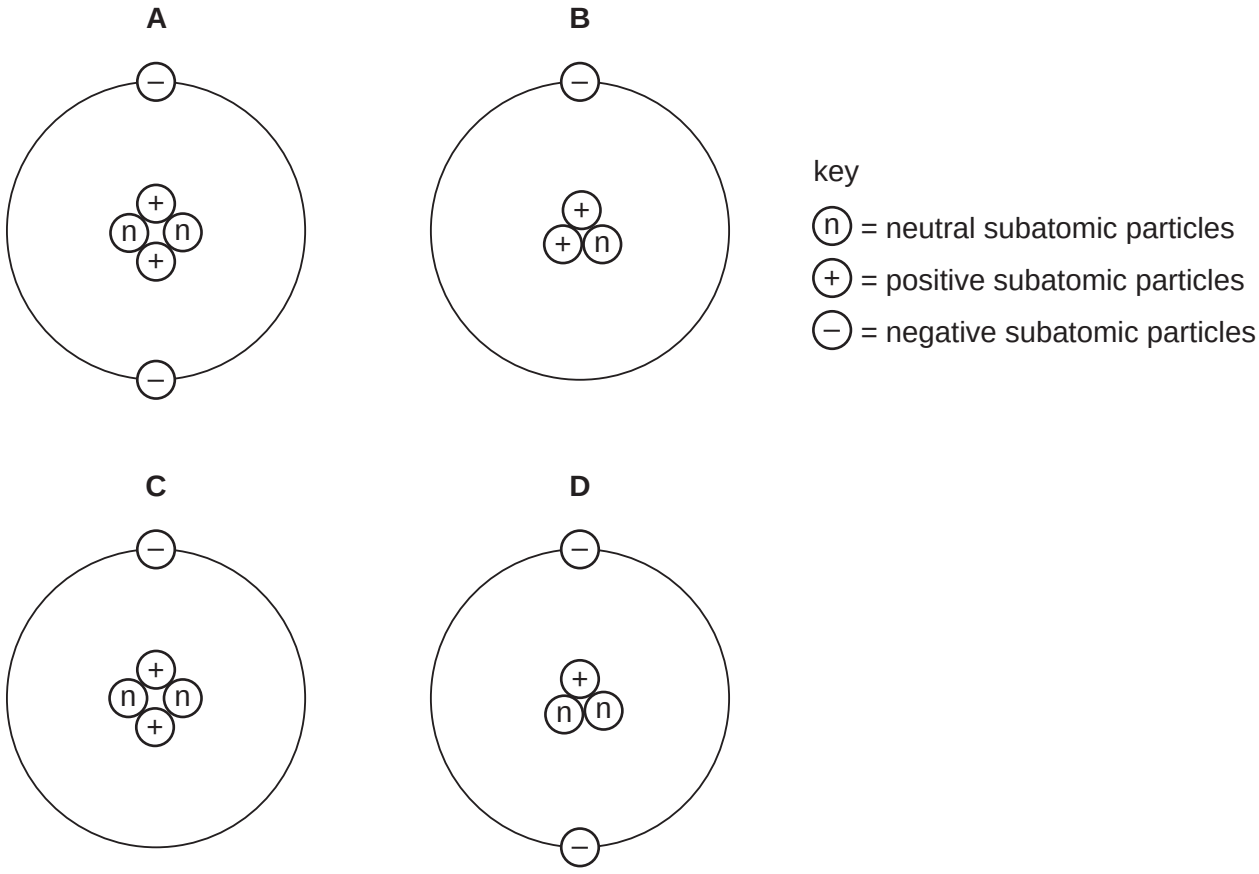
A $I_pV_p = I_sV_s$ $\quad \frac{V_p}{N_p} = \frac{V_s}{N_s}$

B $\frac{V_p}{I_p} = \frac{V_s}{I_s}$ $\quad N_pV_p = N_sV_s$

C $\frac{V_p}{I_p} = \frac{V_s}{I_s}$ $\quad \frac{V_p}{N_p} = \frac{V_s}{N_s}$

D $I_pV_p = I_sV_s$ $\quad N_pV_p = N_sV_s$

33 Which diagram shows the structure of a neutral atom?



34 What is nuclear fission?

A the merging of two nuclei to create a heavier nucleus

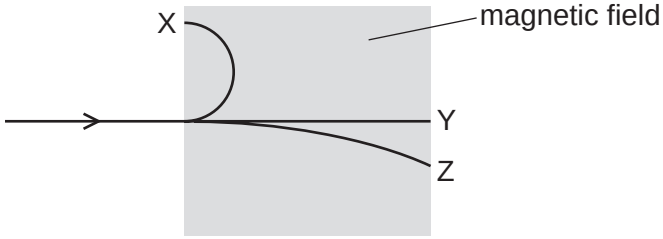
B the process by which electrons are removed from an atom

C the process by which stars generate energy

D the splitting of a nucleus to create two smaller nuclei

35 The diagram represents the paths of three types of ionising radiation, X, Y and Z, through a magnetic field.

The three types of radiation are alpha, beta and gamma.



Which statement about the ionising radiation is correct?

A X is positively charged.

B Y is negatively charged.

C Z is the most strongly ionising.

D X has a smaller mass than Y.

36 Which row correctly matches three radioactive sources to their uses?

	emits alpha-particles and has a long half-life	emits beta-particles and has a long half-life	emits gamma radiation and has a short half-life
A	monitoring the thickness of aluminium foil	smoke alarm	tracer to be injected to detect cancer
B	monitoring the thickness of aluminium foil	tracer to be injected to detect cancer	smoke alarm
C	smoke alarm	monitoring the thickness of aluminium foil	tracer to be injected to detect cancer
D	smoke alarm	tracer to be injected to detect cancer	monitoring the thickness of aluminium foil

37 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 all radioactive emissions.

38 The average distance from the Earth to the Sun is 1.5×10^{11} m.

What is the orbital speed of the Earth?

A 4.0×10^{5} km / day

B 1.3×10^{6} km / day

C 2.6×10^{6} km / day

D 1.9×10^{14} km / day

39 In which order are the objects listed formed during the life cycle of a star?

A protostar → red giant → supernova → stable star

B protostar → stable star → red giant → supernova

C red giant → stable star → protostar → supernova

D red giant → supernova → protostar → stable star

40 What is the distance travelled by light in one year?

A 5.9×10^{15} m

B 5.9×10^{15} km

C 9.5×10^{15} m

D 9.5×10^{15} km

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