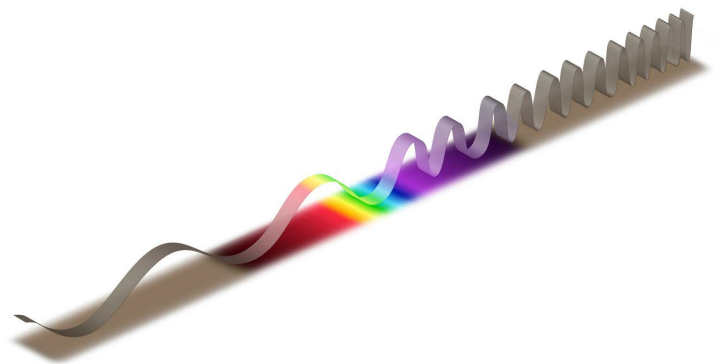


Specimen Paper Answers – Paper 2  
**Cambridge IGCSE™ / IGCSE (9–1)**  
**Physics 0625 / 0972**

For examination from 2023



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## Introduction

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The main aim of this booklet is to exemplify standards for those teaching Cambridge IGCSE / IGCSE (9-1) Physics 0625 / 0972, and to show examples of very good answers.

In this booklet, we have provided answers for all questions with examiner comments. This paper requires candidates to answer multiple choice questions. Candidates are awarded a maximum of 40 marks for this paper and the mark scheme provides the answers required to gain the marks.

Each question and answer is followed by an examiner comment on how each answer should be determined. Additionally, the examiner has set out a number of common mistakes that occur when candidates answer the questions. In this way, it is possible to understand what candidates have done to gain their marks and how they could avoid errors.

The mark schemes for the Specimen Papers are available to download from the School Support Hub at [www.cambridgeinternational.org/support](http://www.cambridgeinternational.org/support)

### 2023 Specimen Paper 2 Mark Scheme

Past exam resources and other teaching and learning resources are available on the School Support Hub [www.cambridgeinternational.org/support](http://www.cambridgeinternational.org/support)

## Assessment at a glance

The syllabus for Cambridge IGCSE Physics 0625 is available at [www.cambridgeinternational.org](http://www.cambridgeinternational.org)

All candidates take three papers. Candidates who have studied the Core syllabus content, or who are expected to achieve a grade D or below, should be entered for Paper 1, Paper 3 and either Paper 5 or Paper 6. These candidates will be eligible for grades C to G.

Candidates who have studied the Extended syllabus content (Core and Supplement), and who are expected to achieve a grade C or above, should be entered for Paper 2, Paper 4 and either Paper 5 or Paper 6. These candidates will be eligible for grades A\* to G.

### Core assessment

Core candidates take Paper 1 and Paper 3. The questions are based on the Core subject content only:

Paper 1: Multiple Choice (Core)	
45 minutes	
40 marks	30%
40 four-option multiple-choice questions	
Externally assessed	

Paper 3: Theory (Core)	
1 hour 15 minutes	
80 marks	50%
Short-answer and structured questions	
Externally assessed	

### Extended assessment

Extended candidates take Paper 2 and Paper 4. The questions are based on the Core and Supplement subject content:

Paper 2: Multiple Choice (Extended)	
45 minutes	
40 marks	30%
40 four-option multiple-choice questions	
Externally assessed	

Paper 4: Theory (Extended)	
1 hour 15 minutes	
80 marks	50%
Short-answer and structured questions	
Externally assessed	

### Practical assessment

All candidates take one practical paper from a choice of two:

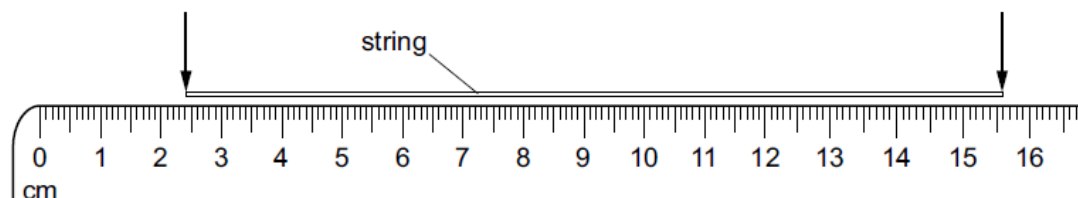
Paper 5: Practical Test	
1 hour 15 minutes	
40 marks	20%
Questions will be based on the experimental skills in Section 4	
Externally assessed	

Paper 6: Alternative to Practical	
1 hour	
40 marks	20%
Questions will be based on the experimental skills in Section 4	
Externally assessed	

## Specimen answers

### Question 1

1 A length of string is measured between two points on a ruler.



When the length of string is wound closely around a pen, it goes round six times.



What is the distance once round the pen?

- A 2.2 cm      B 2.6 cm      C 13.2 cm      D 15.6 cm

**Candidate answer: A**

**Mark awarded = 1**

#### Examiner comment

Measure length and divide by 6.

#### Common mistakes

Failure to allow for false origin.

### Question 2

2 When does an object falling vertically through the air reach terminal velocity?

- A when the acceleration of the object becomes negative  
 B when the acceleration of the object is equal to  $g$   
 C when the air resistance equals the weight of the object  
 D when the air resistance is greater than the weight of the object

**Candidate answer: C**

**Mark awarded = 1**

#### Examiner comment

Recall.

#### Common mistakes

Option D

## Question 3

- 3 An athlete runs a 100 m race in a straight line. The table shows how his speed changes with time for the first 5.0 s of the race.

speed m/s	0	1.7	4.1	5.7	6.5	6.8
time/s	0	1.0	2.0	3.0	4.0	5.0

What is the average acceleration of the athlete between time 2.0 s and time 3.0 s?

- A  $1.6\text{ m/s}^2$       B  $1.9\text{ m/s}^2$       C  $4.9\text{ m/s}^2$       D  $5.7\text{ m/s}^2$

**Candidate answer: A**

**Mark awarded = 1**

**Examiner comment**

$$(5.7 - 4.1) / 1 = 1.6$$

**Common mistakes**

Averages over incorrect period.

## Question 4

- 4 The gravitational field strength on the Moon is  $1.6\text{ N/kg}$ .

An astronaut has a mass of  $75\text{ kg}$ .

What is the weight of the astronaut on the Moon?

- A 47 N      B 75 N      C 120 N      D 740 N

**Candidate answer: C**

**Mark awarded = 1**

**Examiner comment**

$$\text{Weight} = mg = 75 \times 1.6$$

**Common mistakes**

Uses  $m/g$ .

## Question 5

5 Two objects P and Q are placed in a beaker containing a liquid.

Object P floats in the liquid and object Q sinks.

Which row for the densities of object P, object Q and the liquid is possible?

	<u>density of object P</u> g/cm <sup>3</sup>	<u>density of object Q</u> g/cm <sup>3</sup>	<u>density of liquid</u> g/cm <sup>3</sup>
<b>A</b>	1.2	0.6	0.8
<b>B</b>	1.2	1.4	1.0
<b>C</b>	11.3	8.9	13.6
<b>D</b>	11.3	19.3	13.6

Candidate answer: D

Mark awarded = 1

## Examiner comment

Recall.

## Question 6

6 A ball of mass 0.12 kg is hit by a tennis player.

The velocity of the ball changes from 0 m/s to 5.0 m/s in 0.60 s.

What is the average resultant force acting on the ball while it is being hit?

**A** 1.0 N      **B** 2.5 N      **C** 3.6 N      **D** 8.3 N

Candidate answer: A

Mark awarded = 1

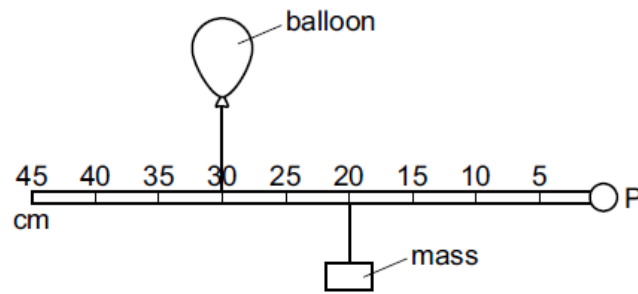
## Examiner comment

Mass x acceleration = 0.12 x ((5.0 – 0)/0.6)



## Question 7

- 7 A balloon and a mass are attached to a rod that is pivoted at a fixed point P.



The balloon is filled with helium, which is a gas that is less dense than air.

The balloon filled with helium applies an upward force on the rod.

The rod is horizontal and in equilibrium.

Which action causes the rod to rotate clockwise?

- A moving the balloon to the 40 cm mark and the mass to the 30 cm mark
- B moving the balloon to the 20 cm mark and the mass to the 10 cm mark
- C moving the balloon to the 25 cm mark and the mass to the 25 cm mark
- D moving the balloon to the 20 cm mark and the mass to the 30 cm mark

**Candidate answer: B**

**Mark awarded = 1**

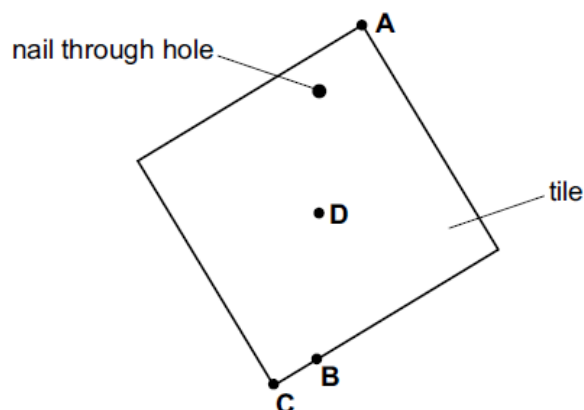
## Examiner comment

Moment = force x distance

## Question 8

- 8 A hole is made in a square tile of uniform thickness. The diagram shows the tile hanging loosely on a nail.

Where is the centre of gravity of the tile?



**Candidate answer: D**

**Mark awarded = 1**

**Examiner comment**

Recall.

**Common mistakes**

Option B since it is below the pivot.

### Question 9

9 An object of mass 0.16 kg is moving forwards at a speed of 0.50 m/s.

A second object of mass 0.10 kg is at rest.

The first object strikes the second object.

After the collision, the second object moves forwards at a speed of 0.50 m/s.

What is the speed of the first object after the collision?

**A** 0.0 m/s      **B** 0.19 m/s      **C** 0.31 m/s      **D** 0.50 m/s

**Candidate answer: B**

**Mark awarded = 1**

**Examiner comment**

$(0.16 \times 0.5) = (0.16 \times v) + (0.1 \times 0.5)$

**Common mistakes**

Incorrect sign on right-hand side.

### Question 10

10 A ball is at rest at the top of a hill.

The ball rolls down the hill.

At the bottom of the hill the ball hits a wall and stops.

Which energy changes occur?

**A** gravitational potential energy → internal energy → kinetic energy

**B** gravitational potential energy → kinetic energy → internal energy

**C** kinetic energy → gravitational potential energy → internal energy

**D** kinetic energy → internal energy → gravitational potential energy

**Candidate answer: B**

**Mark awarded = 1**

**Examiner comment**

Recall.

**Common mistakes**

Meaning of internal energy.

**Question 11**

11 A man climbs a ladder.

Which quantities can be used to calculate the useful power of the man?

- A the weight of the man and the time taken only
- B the weight of the man and the vertical distance moved only
- C the work done by the man and the time taken only
- D the work done by the man and the vertical distance moved only

**Candidate answer: C**

**Mark awarded = 1**

**Examiner comment**

Power = (work done) / time

**Common mistakes**

Confusion of power with work done.

**Question 12**

12 A student uses her thumb to push a drawing pin (thumb tack) into a notice board.

The pin goes into the board but does not penetrate her thumb.

Which statement explains this?

- A The force exerted by the pin on her thumb is greater than the force exerted by the pin on the notice board.
- B The force exerted by the pin on the notice board is greater than the force exerted by the pin on her thumb.
- C The pressure of the pin on her thumb is greater than the pressure of the pin on the notice board.
- D The pressure of the pin on the notice board is greater than the pressure of the pin on her thumb.

**Candidate answer: D**

**Mark awarded = 1**

**Examiner comment**

Same force, larger area and  $p = F/A$

**Common mistakes**

Smaller area so smaller force.

### Question 13

13 A submarine is a boat that can travel below the surface of the sea.

A submarine is 20 m below the surface of the sea. The pressure due to the sea water at this depth is  $P$ .

On another day, the submarine is 26 m below the surface of fresh water.

The density of sea water is 1.3 times the density of fresh water.

What is the pressure due to the fresh water at a depth of 26 m?

- A  $\frac{P}{1.3}$       B  $P$       C  $1.3 P$       D  $1.7 P$

**Candidate answer: B**

**Mark awarded = 1**

#### Examiner comment

Use of expression pressure = depth x density x  $g$ .

#### Common mistakes

Incorrect application of 1.3 factor.

### Question 14

14 When particles of a gas collide with a wall of a container, the wall experiences a pressure.

What is the cause of this pressure?

- A the change in energy of the particles
- B the change in momentum of the particles
- C the change in power of the particles
- D the change in speed of the particles

**Candidate answer: B**

**Mark awarded = 1**

#### Examiner comment

Recall.

## Question 15

15 A substance can exist in three different states: solid, liquid or gas.

Each of the two statements below describes a change of state.

change 1: Particles move much closer together but continue to travel throughout the substance.

change 2: Particles stop travelling throughout the substance and just vibrate about fixed positions.

Which changes of state do these statements describe?

	change 1	change 2
<b>A</b>	condensation	melting
<b>B</b>	condensation	solidification
<b>C</b>	solidification	condensation
<b>D</b>	solidification	melting

**Candidate answer: B**

**Mark awarded = 1**

## Examiner comment

Recall.

## Common mistakes

Misunderstanding of the term condensation.

## Question 16

16 Copper is a type of metal.

A block of copper has a mass of 2.0 kg.

The block of copper absorbs 12000 J of thermal energy.

The specific heat capacity of copper is 385 J/(kg °C).

What is the temperature rise of the copper?

- A** 15.6 °C      **B** 31.2 °C      **C** 46.8 °C      **D** 62.4 °C

**Candidate answer: A**

**Mark awarded = 1**

## Examiner comment

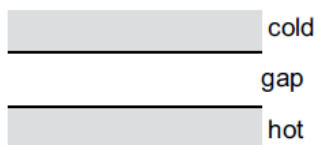
Energy = mass x s.h.c. x temperature change

## Common mistakes

Misuse of s.h.c.

### Question 17

- 17 The diagram shows the gap between a hot surface and a cold surface. The gap can contain air (gas), iron (solid), a vacuum or water (liquid).



Which material in the gap allows the quickest transfer of thermal energy between the surfaces by conduction?

- A air (gas)
- B iron (solid)
- C vacuum
- D water (liquid)

**Candidate answer: B**

**Mark awarded = 1**

#### Examiner comment

Recall.

### Question 18

- 18 Which row about boiling and about evaporation is correct?

	boiling	evaporation
<b>A</b>	takes place only at the surface	takes place only at the surface
<b>B</b>	takes place only at the surface	takes place throughout the liquid
<b>C</b>	takes place throughout the liquid	takes place only at the surface
<b>D</b>	takes place throughout the liquid	takes place throughout the liquid

**Candidate answer: C**

**Mark awarded = 1**

#### Examiner comment

Recall.

## Question 19

19 Light travels at a speed of  $2.0 \times 10^8$  m/s in a glass block.

In the glass, the wavelength of the light is  $4.0 \times 10^{-7}$  m.

What is the frequency of the light?

- A  $2.0 \times 10^{-15}$  Hz
- B  $1.3 \times 10^{-2}$  Hz
- C 80 Hz
- D  $5.0 \times 10^{14}$  Hz

**Candidate answer: D**

**Mark awarded = 1**

## Examiner comment

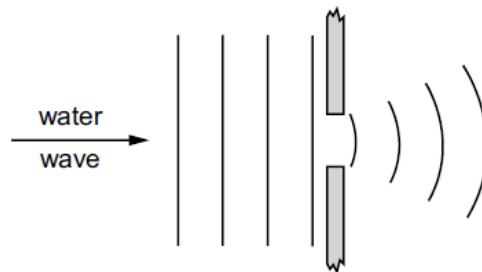
$(2.0 \times 10^8) = f \times (4.0 \times 10^{-7})$

## Common mistakes

Incorrect substitution.

## Question 20

20 In a shallow tank, a water wave moves through a barrier with a narrow gap. The diagram shows the waves on the left-hand side and the right-hand side of the barrier.



Which term describes the effect shown?

- A reflection
- B dispersion
- C refraction
- D diffraction

**Candidate answer: D**

**Mark awarded = 1**

## Examiner comment

Recall.

### Question 21

- 21 Which statement describes monochromatic light?
- A light that never diffracts
  - B light that has a single frequency
  - C light that spreads out when shone through a glass prism
  - D light that travels at the same speed in all materials

**Candidate answer: B**

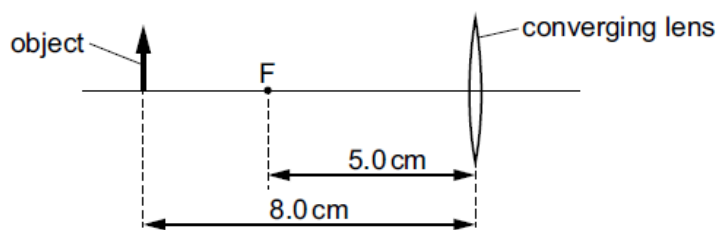
**Mark awarded = 1**

#### Examiner comment

Recall.

### Question 22

- 22 An object is placed 8.0 cm from a thin converging lens of focal length 5.0 cm.



Which statement about the image formed by the lens is correct?

- A The image is real and inverted.
- B The image is real and upright.
- C The image is virtual and inverted.
- D The image is virtual and upright.

**Candidate answer: A**

**Mark awarded = 1**

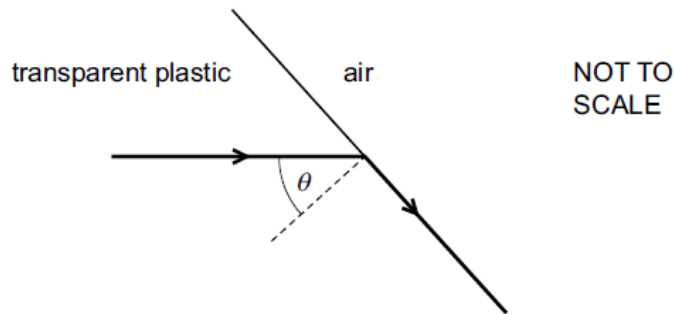
#### Examiner comment

Recall.



## Question 23

23 A ray of light travels through transparent plastic to air.



The ray of light enters the air travelling parallel to the surface of the plastic.

The refractive index of the plastic is 1.25.

What is angle  $\theta$ ?

- A  $37^\circ$       B  $39^\circ$       C  $51^\circ$       D  $53^\circ$

**Candidate answer: D**

**Mark awarded = 1**

**Examiner comment**

$1.25 = 1/\sin C$

**Common mistakes**

Incorrect substitution.

## Question 24

24 What is the speed of electromagnetic waves in a vacuum?

- A  $3.0 \times 10^4$  cm/s  
 B  $3.0 \times 10^5$  km/s  
 C  $3.0 \times 10^6$  cm/s  
 D  $3.0 \times 10^{11}$  km/s

**Candidate answer: B**

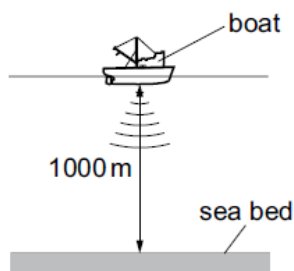
**Mark awarded = 1**

**Examiner comment**

Recall.

### Question 25

- 25 A pulse of sound is produced at the bottom of a boat. The sound travels through the water and is reflected from the sea bed. The sound reaches the boat again after 1.3 s. The sea bed is 1000 m below the boat.



Using this information, what is the speed of sound in the water?

- A 770 m/s      B 1300 m/s      C 1500 m/s      D 2600 m/s

**Candidate answer: C**

**Mark awarded = 1**

**Examiner comment**

Speed = distance / time.

**Common mistakes**

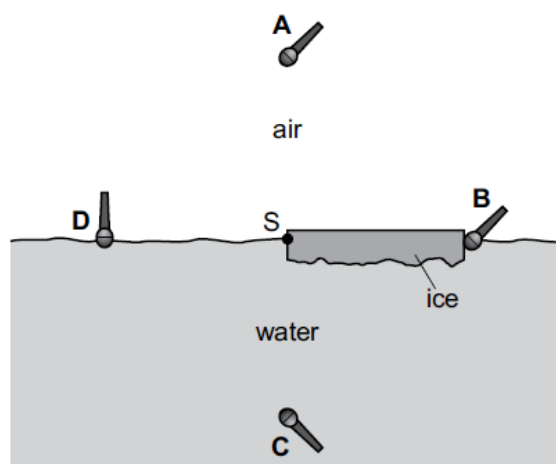
Use of depth, not (2 x depth).

### Question 26

- 26 A sheet of ice floats on water. A source of sound S is positioned at the edge of the ice sheet.

Four microphones are placed equal distances from S.

Which microphone detects the sound from S first?



**Candidate answer: B**

**Mark awarded = 1**

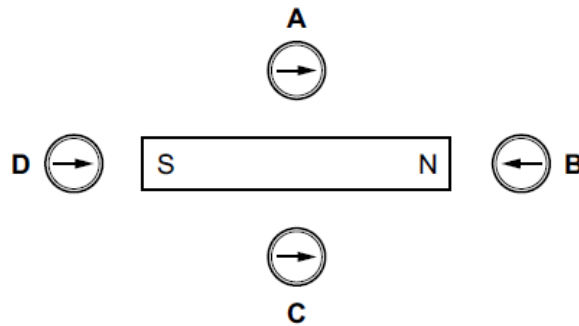
**Examiner comment**

Recall.

## Question 27

27 The diagram shows a bar magnet and four plotting compasses.

Which compass correctly shows the direction of the magnetic field due to the magnet?



Candidate answer: D

Mark awarded = 1

## Examiner comment

Recall.

## Question 28

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

What happens to the plastic rod and what is the charge on the cloth?

	plastic rod	charge on cloth
A	gains electrons	negative
B	gains electrons	positive
C	loses electrons	negative
D	loses electrons	positive

Candidate answer: C

Mark awarded = 1

## Examiner comment

Recall of charge on electron and electron movement.

## Common mistakes

Electrons are not conserved.

### Question 29

29 The electromotive force (e.m.f.) of a mobile phone battery is 3.7 V.

What does this mean?

- A 3.7 J is the maximum energy the battery can provide in 1.0 s.
- B 3.7 J is the total energy the battery can provide before it has to be recharged.
- C 3.7 J of energy is provided by the battery to drive a charge of 1.0 C around a complete circuit.
- D 3.7 J of energy is provided by the battery to drive a current of 1.0 A around a complete circuit.

**Candidate answer: C**

**Mark awarded = 1**

### Examiner comment

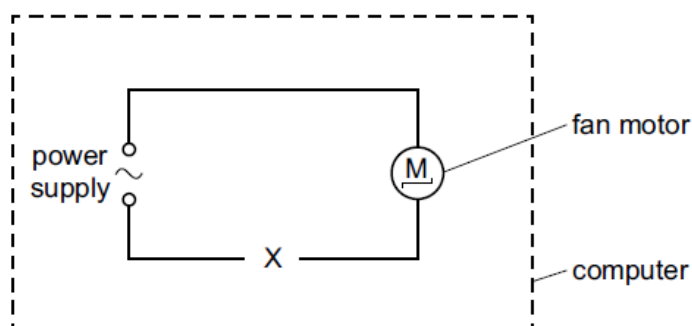
Recall and use of quantities.

### Common mistakes

Option D is a common incorrect answer.

### Question 30

30 A computer engineer wants the speed of a fan to increase when the temperature inside a computer increases. The engineer knows that a larger current causes the fan to turn more quickly.



Which component should be placed at X to make this happen?

- A a relay
- B a thermistor
- C a transformer
- D a variable resistor

**Candidate answer: B**

**Mark awarded = 1**

### Examiner comment

Resistance of thermistor is temperature dependent.

### Common mistakes

Variable resistor.

**Question 31**

31 A water heater is connected to a 230 V supply and there is a current of 26 A in the heater.

It takes 20 minutes to heat the water to the required temperature.

How much energy is supplied by the heater?

- A  $6.0 \times 10^3$  J
- B  $1.0 \times 10^4$  J
- C  $1.2 \times 10^5$  J
- D  $7.2 \times 10^6$  J

**Candidate answer: D**

**Mark awarded = 1**

**Examiner comment**

Energy =  $230 \times 26 \times (20 \times 60)$

**Common mistakes**

Failure to convert minutes to seconds.

**Question 32**

32 An electric kettle has a metal casing. The cable for the kettle contains a wire that is connected to the earth pin of the plug.

Which danger does this guard against?

- A the cable to the kettle becoming too hot
- B the casing of the kettle becoming live
- C the casing of the kettle becoming wet on the outside
- D the casing of the kettle overheating

**Candidate answer: B**

**Mark awarded = 1**

**Examiner comment**

Recall purpose of earthing.

**Common mistakes**

Some reference to overheating.

## Question 33

33 An electric current can produce a heating effect and a magnetic effect.

Which row shows the effect that a relay uses and one application of a relay?

	effect used by a relay	one application of a relay
A	heating effect	allowing a small current to switch on a large current
B	heating effect	changing the voltage of an a.c. supply
C	magnetic effect	allowing a small current to switch on a large current
D	magnetic effect	changing the voltage of an a.c. supply

Candidate answer: C

Mark awarded = 1

## Examiner comment

Recall.

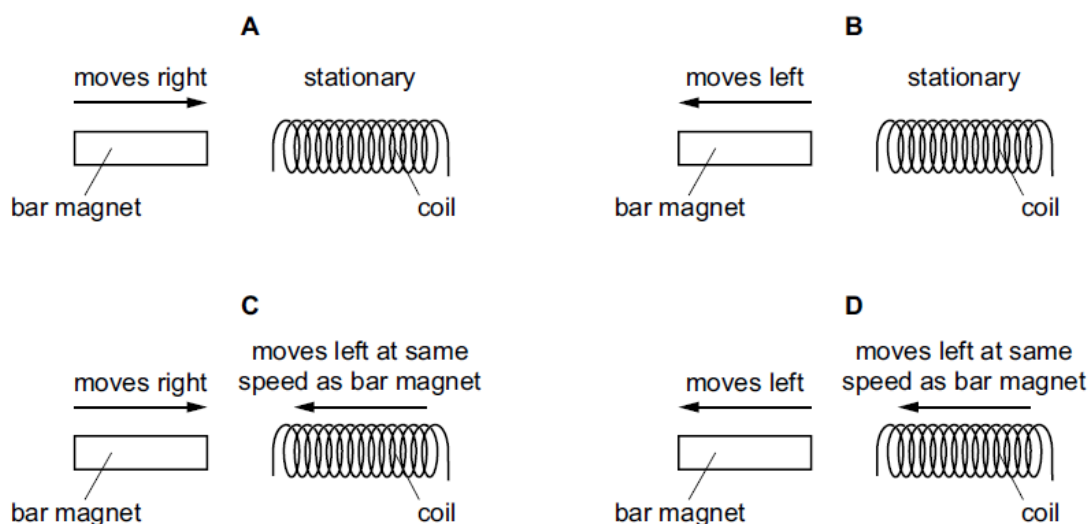
## Common mistakes

Confusing relay with transformer.

## Question 34

34 The diagram shows a bar magnet and a coil of wire. The bar magnet is moved at the same speed in each experiment.

In which situation is the largest electromotive force (e.m.f.) induced?



Candidate answer: C

Mark awarded = 1

## Examiner comment

Interpretation of diagrams to give greatest rate of cutting of lines.

## Common mistakes

Consideration of direction of induced e.m.f.

## Question 35

35 Increasing the transmission voltage in transmission cables reduces power losses.

What is the explanation for this reduction?

- A The current decreases, reducing thermal energy losses.
- B The current increases, increasing the flow of charge.
- C The resistance of the cable increases, reducing the current.
- D The resistance of the cable decreases.

**Candidate answer: A**

**Mark awarded = 1**

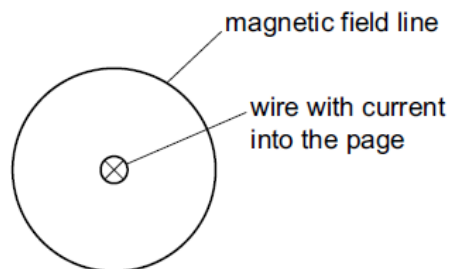
## Examiner comment

Recall.

## Question 36

36 There is an electric current in a straight wire in the direction into the page. This produces a magnetic field around the wire.

All the field lines are circles but only one field line is shown.



Which row describes the magnetic field?

	direction of the field lines	spacing of the field lines
<b>A</b>	anti-clockwise	equally spaced over the whole field
<b>B</b>	anti-clockwise	more widely spaced further from the wire
<b>C</b>	clockwise	equally spaced over the whole field
<b>D</b>	clockwise	more widely spaced further from the wire

**Candidate answer: D**

**Mark awarded = 1**

## Examiner comment

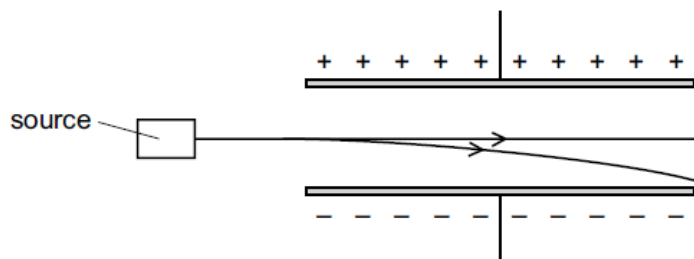
Recall.

## Common mistakes

Failure to appreciate spacing and/or direction.

## Question 37

- 37 The diagram shows emissions from a source passing into the electric field between two charged plates.



What is emitted by this source?

- A neutrons and  $\gamma$ -rays only
- B  $\alpha$ -particles and  $\beta$ -particles only
- C  $\alpha$ -particles and  $\gamma$ -rays only
- D  $\beta$ -particles and  $\gamma$ -rays only

**Candidate answer: C**

**Mark awarded = 1**

## Examiner comment

Recall.

## Common mistakes

Confusion with sign of charge and deflection.

## Question 38

- 38 Which row in the table describes the process of nuclear fusion and identifies the change in total mass of the particles involved?

	process	change in total mass of the particles
<b>A</b>	a large nucleus splits into two smaller nuclei	decreases
<b>B</b>	a large nucleus splits into two smaller nuclei	increases
<b>C</b>	two small nuclei combine to form a larger nucleus	decreases
<b>D</b>	two small nuclei combine to form a larger nucleus	increases

**Candidate answer: C**

**Mark awarded = 1**

## Examiner comment

Recall.

## Common mistakes

Confusion with fission.



**Question 39**

39 The orbit of the Moon around the Earth is modelled as a circular path of radius  $3.8 \times 10^5$  km.

The orbital period is 29.5 days (710 hours).

What is the orbital speed of the Moon?

- A  $5.4 \times 10^2$  km/h
- B  $1.1 \times 10^3$  km/h
- C  $1.7 \times 10^3$  km/h
- D  $3.4 \times 10^3$  km/h

**Candidate answer: D**

**Mark awarded = 1**

**Examiner comment**

$2 \times \pi \times (3.8 \times 10^5) / 710$

**Common mistakes**

Correct formula for circumference.

**Question 40**

40 Which statement does **not** describe redshift?

- A All the light emitted from all distant galaxies is at the red end of the spectrum.
- B The light arriving at the Earth from a receding star is always redshifted.
- C During redshift, the wavelength of the observed light is longer than it is if the redshift had not occurred.
- D The light from stars in all distant galaxies is moved towards the red end of the spectrum.

**Candidate answer: A**

**Mark awarded = 1**

**Examiner comment**

Recall.

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