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GCSE (9-1)

Examiners' report

# TWENTY FIRST CENTURY SCIENCE COMBINED SCIENCE B

J260

For first teaching in 2016

## J260/07 Summer 2022 series

Version 1

ocr.org.uk/science

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# Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. A selection of candidate answers are also provided. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

**Advance Information for Summer 2022 assessments**

To support student revision, advance information was published about the focus of exams for Summer 2022 assessments. Advance information was available for most GCSE, AS and A Level subjects, Core Maths, FSMQ, and Cambridge Nationals Information Technologies. You can find more information on our website.

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# Paper 7 series overview

J260/07 is one of the four examination components for the Higher Tier GCSE (9-1) Twenty First Century Science Combined Science B. This component assesses the contents of the physics chapters P1 to P6 and the practical skills in chapter BCP7. The question styles used include objective, short answer and one extended Level of Response

| Candidates who did well on this paper generally did the following: | Candidates who did less well on this paper generally did the following: |
|---|---|
| • produced a clear answer to the Level of Response question (Question 1d) that explained the data presented.<br>• stated correct equations in calculation questions and showed full working, especially in questions with multiple stages to the calculation, such as Q6bi, Q8ci and Q10a.<br>• used scientific terminology appropriately when applying knowledge.<br>• showed the ability to analyse information to make conclusions and presented them in a clear and concise way.<br>• applied knowledge of correct scientific units, conversion of units, standard form and rearrangement of equations. | • did not answer questions with the command word in mind, for example in Question 1d.<br>• did not state the correct equations and show working in calculations.<br>• frequently used everyday words and phrases rather than correct scientific terminology. |

There was no evidence that any time constraints had led to a candidate underperforming.


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## Question 1 (b)

**(b)** Sundip installs panels made of material with low thermal conductivity to the walls of a house.

Describe how this will help to keep the house warm when it is cold outside.

.......................................................................................................................................

....................................................................................................................................... **[1]**

This question required candidates to describe how the low thermal conductivity reduced the rate of energy transfer out of the house. Very few candidates described a reduction in the rate of transfer, most described a reduction in energy transfer but without any reference to time.

### Exemplar 1

The lack of thermal conductivity allows ~~less~~
Less heat to travel from the house to the outside.

If the candidate had added 'per unit time' onto the end of their description, this response would have been given 1 mark.

## Question 1 (c)

**(c)** Sundip buys electricity from a company that uses energy from renewable energy resources.

What is the difference between a renewable and non-renewable energy resource?

.......................................................................................................................................

....................................................................................................................................... **[1]**

The best responses were succinct and referenced the idea of replenishment for a renewable resource, or having a finite supply of non-renewable resources

**Misconception**

A common misconception is that an energy resource can be re-used, therefore making it renewable.


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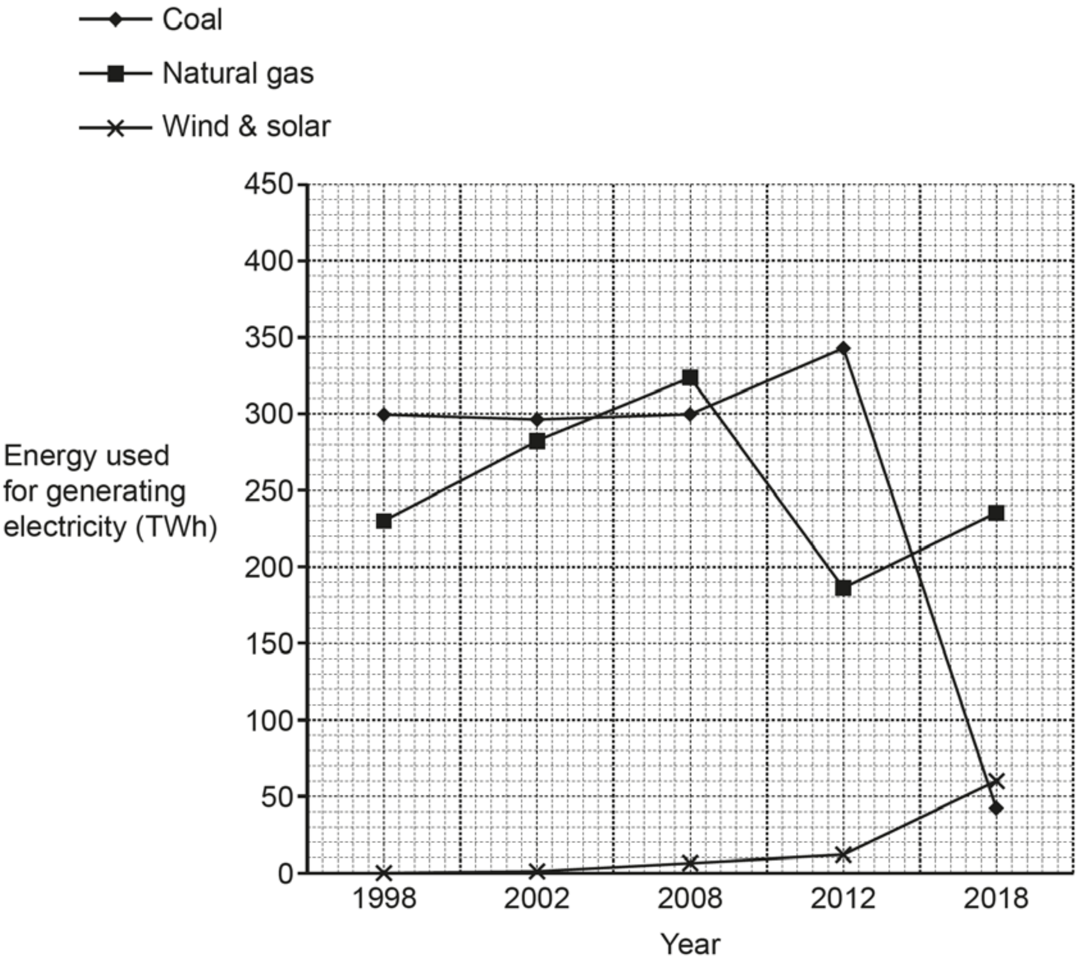
## Question 1 (d)*

**(d)*** The graph shows how some energy resources were used to generate electricity in the UK over 20 years.




Explain how the use of these **three** energy resources changed between 1998 and 2018.

..........................................................................................................................................

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..........................................................................................................................................

.................................................................................................................................... **[6]**

This question asked candidates to explain the data presented to them. Many candidates only described the data and so produced limited responses simply describing the shape of the graphs. The best responses gave a description of the trend for a resource referencing years on the graph and then linked the change to a short explanation, giving a reason for the change, before moving on to another resource. Some responses were unclear due to an attempt to describe/explain two or more resources at the same time. Candidates should be encouraged to plan their answers before attempting a Level of Response question.



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## Exemplar 2

In 1998, Wind & Solar energy was not used
until 2002. However, coal & natural gas was
used. Coal was used most, at a pretty constant
rate until 2008 where it actually increased.
The use of natural gas had a constant increase from
1998 till 2008 when it was actually used the
most. Post 2008 use of coal increased to dominate
in 2012 with 340TWh, use of natural gas decrease
to less than 200 TWh & use of wind & solar energy
was starting to increase to only 10TWh. Post 2012,
coal had a drastic decrease to the point where it was
used less than wind & solar energy. Wind & solar started
to rise faster & in 2018 it was at 60TWh. [6]

02 Turn over

This is an example of a common Level 1 response. This response does not attempt to explain the changes. Candidates need to be confident with the meaning of the various command words used in exam questions. The difference between describe and explain is an important one.


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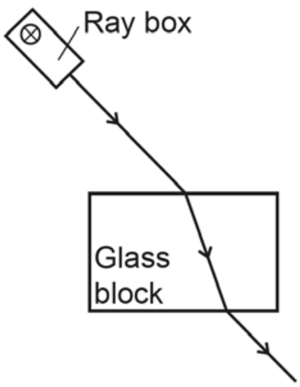
## Question 2 (a)

**2** Alex is investigating the refraction of light in a rectangular glass block, using the equipment shown in the diagram.




**(a)** This is Alex's method.
The sentences are **not** in the correct order.

**A.** Repeat the experiment for different angles of incidence.
**B.** Shine a ray of light into the block.
**C.** Place the glass block on some paper.
**D.** Measure the angle of incidence and angle of refraction.
**E.** Mark the path of the rays on the paper with a pencil.
**F.** Draw a line to show the path of the ray inside the glass block.
**G.** Remove the glass block and ray box.

Write the letters in the boxes to show the correct order of the method.

The first one has been done for you.

| | | | | | | |
|---|---|---|---|---|---|---|
| C | | | | | | |

**[3]**

This question was testing candidates' knowledge of the refraction experiment. Most scored 2 or 3 marks here, those who scored 2 marks often did so due to getting F and G the wrong way around.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## Question 2 (b)

**(b)** Suggest **two** ways in which Alex could improve his method to get more accurate measurements of the angles.

1 ....................................................................................................................................

....................................................................................................................................

2 ....................................................................................................................................

.................................................................................................................................... **[2]**

This question required candidates to give two ways to make the measurements more accurate. Many had the correct idea of making it easier to take the measurement, such as dark room or use of a ruler for the rays. But some candidates incorrectly focused on reliability or repeatability.

## Question 2 (c) (iv)

**(iv)** Describe the relationship between the angle of incidence and the angle of refraction for the rectangular glass block in Alex's investigation.

....................................................................................................................................

.................................................................................................................................... **[1]**

There is a positive correlation between the two variables. Some candidates described a directly proportional relationship, which is incorrect as the line does not pass through the origin and should not be straight.


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## Question 3 (a)

**3** Waves can form on the surface of water.

**Fig. 3.1** is a diagram of a water wave on the surface of water.

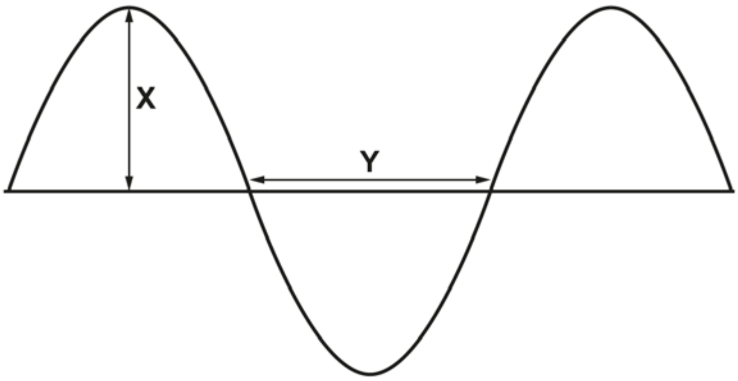


**Fig. 3.1**

**(a)** Which **two** statements about the water wave are correct?

Tick (✓) **two** boxes.

The amplitude of the wave is **X**. ☐

The wavelength of the wave is **Y**. ☐

The wave travels but the water does not. ☐

The water wave is a longitudinal wave. ☐

Water waves always travel at the same speed. ☐

**[2]**

Most candidates correctly ticked the first box, but not as many ticked the third box. This could be highlighting a misconception about water travelling with the wave.


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## Question 3 (b)

**(b)** Mia is looking at a fish in a pond. The light waves from the fish are refracted as shown in **Fig. 3.2**.

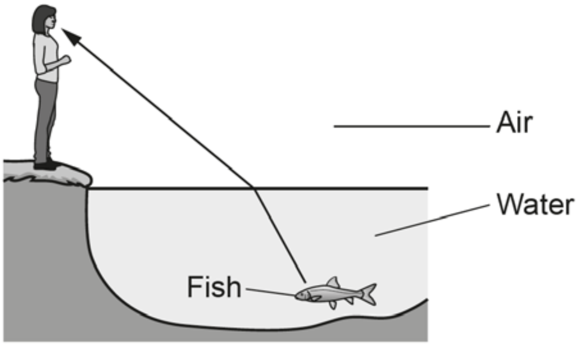


**Fig. 3.2**

Explain why the light waves from the fish are refracted as they pass from water to air.

.......................................................................................................................................

.......................................................................................................................................

.......................................................................................................................................

....................................................................................................................................... **[2]**

Candidates could score marks here for an explanation using (optical) density, speed of the wave and/or wavelength. The most common correct answer included density change and a change in speed. Very few mentioned wavelength change.


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## Question 4 (a)

**4** A resistor **X** is connected to the terminals of a 12 V battery. The energy transferred from the battery to the resistor is 1.2 J per second.

**(a)** What is the power transferred to the resistor?

Use the Data Sheet.

Explain your answer.

Power = .................................... W

Explanation ..........................................................................................................................

.........................................................................................................................................

......................................................................................................................................... **[2]**

Although many candidates knew and used the correct equation here they simply used data from the stem without considering what quantity the data represented. Candidates should be encouraged to look at units to check that they are using data for the correct quantity.


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## Question 4 (b)

**(b)** Ali wants to determine the resistance of resistor **X**.

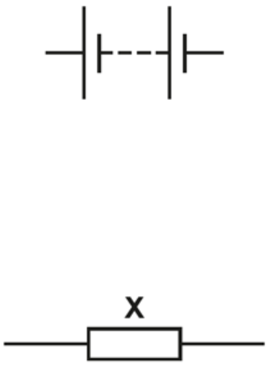


**Fig. 4.1**

Complete the circuit diagram in **Fig. 4.1** to allow Ali to determine the resistance of resistor **X**. **[2]**

Candidates were expected to draw a complete circuit with an ammeter in series and a voltmeter in parallel with the resistor. Most candidates correctly placed the ammeter, but many omitted the voltmeter or drew it in the wrong place.



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## Question 4 (c) (i)

**(c)** **Fig. 4.2** shows a second resistor **Y** connected in parallel with resistor **X**.

The total current in this circuit is 1.0 A and the current through resistor **X** is 0.1 A.

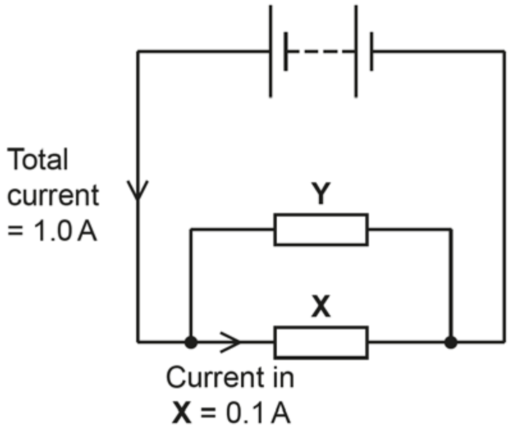


**Fig. 4.2**

**(i)** Explain why the resistance of **Y** is smaller than the resistance of **X**.

..............................................................................................................................

..............................................................................................................................

..............................................................................................................................

..............................................................................................................................

..............................................................................................................................

.............................................................................................................................. **[3]**

Although most candidates had some understanding of current in series and parallel, they found this difficult to apply to the circuit given. The best responses correctly determined the current through Y as 0.9A and then went on to explain why that gives a smaller resistance value for Y if the potential difference is the same across both resistors.


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## Question 4 (c) (ii)

**(ii)** The potential difference across **Y** is 12 V.

Calculate the resistance of **Y**.

Use the equation: potential difference = current × resistance

Give your answer to **2** significant figures.

State the unit.

Resistance = ........................ Unit = ....................... **[5]**

As with all calculations the best responses were those where candidates set them out in a logical manner. Many responses were seen in which working jumped around the space available with no reference to where and how the calculation had progressed. Candidates should be encouraged to show each stage in a calculation and to label quantities either by stating R = and/or by using units, e.g. I = …A

### Exemplar 3

Use the equation: potential difference = current × resistance

Give your answer to **2** significant figures.

State the unit.

current of Y
= 1 - 0.1
= 0.9A

potential difference = current × resistance

Resistance = potential difference / current
= 12V / 0.9A
= 13.3

Resistance = 13 Unit = Ω **[5]**

This response shows one way in which the working can be shown clearly. The candidate has clearly shown the calculation of the current in Y at top right. They have then shown rearrangement and substitution before giving the response. They then round to 2sf and give the correct unit for full marks.


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## Question 4 (d)

Ali wants to measure the total current in the circuit, but his ammeter can only measure up to 0.2A.

He connects the ammeter in the circuit as shown in **Fig. 4.3**.

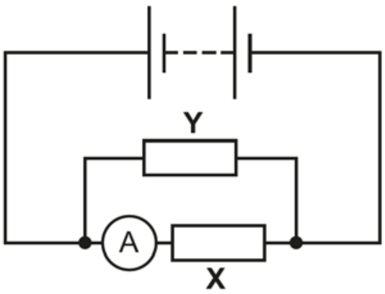


**Fig. 4.3**

**(d)** **Fig. 4.4** shows a graph of the current through resistor **X** for different values of the total current in the circuit.

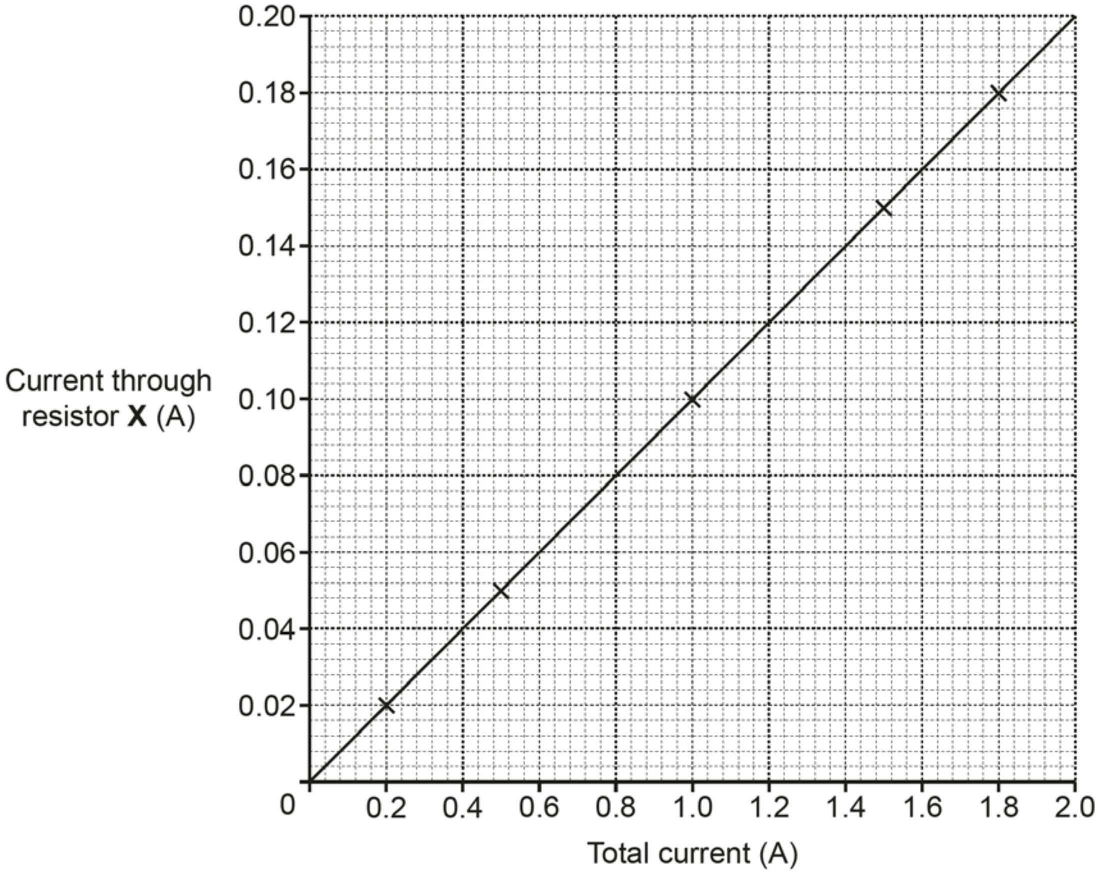


**Fig. 4.4**

How does the graph show that Ali can determine higher total currents up to 2.0A in the circuit in **Fig. 4.3**?

.............................................................................................................................................

.............................................................................................................................................

............................................................................................................................................. **[1]**


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The clearest answers to this question described how the current through X could be used by giving an example, e.g. a current in X of 0.04 x 10 will give the total current. Candidates should be encouraged to use data from given graphs even if not explicitly asked for it in the question.

## Question 5

**5** Kai watches as a metal bar is heated up.
After some heating it starts to glow red. After more heating it appears orange and finally yellow.

Kai tries to explain what happens.

> Cold objects do not emit radiation.
>
> When the bar has been heated for a long enough time it starts to emit red light.
>
> The longer it is heated the more colour changes happen. It stops emitting red wavelengths and gives out orange wavelengths.
>
> Finally, it changes to emit yellow wavelengths.

**Kai**

Explain what is wrong with Kai's explanation.

.......................................................................................................................................

.......................................................................................................................................

.......................................................................................................................................

....................................................................................................................................... **[2]**

Many candidates understood and correctly stated that cold objects do emit radiation, but very few candidates were able to link temperature to the wavelength of radiation emitted.

**Misconception**

Many candidates stated that the link between colour and wavelength was an error in the explanation. Very few candidates made any sort of link between visible light colour and wavelength.



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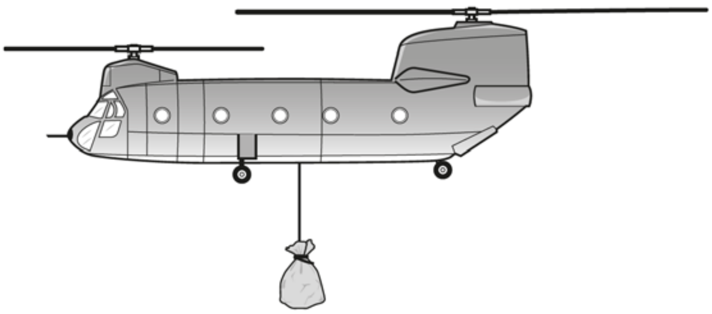
## Question 6 (a)

**6** In 2019 the wall of the dam at the Toddbrook water reservoir was damaged.

The wall of the dam was strengthened using large bags of rock.
The image shows a helicopter carrying a large bag of rock.



**(a)** Draw a free body force diagram for the bag of rock when the helicopter is stationary in the air above the dam.

**[3]**

Few candidates seemed to recognise that the dot represented the bag and how to draw a free body diagram. Many referred to the downward force as gravity. Very few carefully drew arrows of equal length.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## Question 6 (b) (i)

**(b)** The height of the water in the reservoir was reduced by removing 966 000 $m^3$ of water.

**(i)** Calculate the weight of this volume of water.

Use the equation: density = mass ÷ volume

Density of water = 1000 kg / $m^3$
Gravitational field strength = 10 N / kg

Weight = ...................................................... N **[4]**

This question required candidates to first calculate the mass of the water and then use that mass to calculate the weight. The best responses to this question were clearly set out using a logical sequence, each stage was signposted using an equation at the start or an answer with units at the end. Common errors were incorrectly rearranging the equation for density and dividing mass by 10 to find weight.

## Question 6 (b) (ii)

**(ii)** The water was pumped out of the reservoir by 23 pumps.

The 23 pumps worked together to raise the water a distance of 4.1 m.

Calculate the mean work done by **one** of the 23 pumps to raise the water a distance of 4.1 m.

Use the equation: Work done = force × distance

Use your answer to **(i)**.

Work done = ...................................................... J **[3]**

This question required candidates to calculate the total work done and then divide that quantity by 23 to calculate the work done by one pump. Many candidates managed to calculate the total work done but did not realise that they had to divide by 23.


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## Question 7 (a)

**7** A radioactive source emits ionising radiation.

**(a)** Complete the table to show which materials absorb **alpha** radiation.
Tick (✓) at least **one** box.

| **Radiation** | **Absorbing material** | | |
|---|---|---|---|
| | **Paper** | **Thin aluminium** | **Thick lead** |
| alpha | | | |
| beta | | ✓ | ✓ |
| gamma | | | ✓ |

**[1]**

Some candidates appeared to be unclear as to what it means for a material to absorb radiation. Many here just ticked paper in the alpha row. A correct answer here often led to a more successful response in 7b

## Question 7 (b)

**(b)** Kareem uses the equipment shown in **Fig. 7.1** to investigate how different absorbing materials affect the amount of radiation received by a radiation detector.

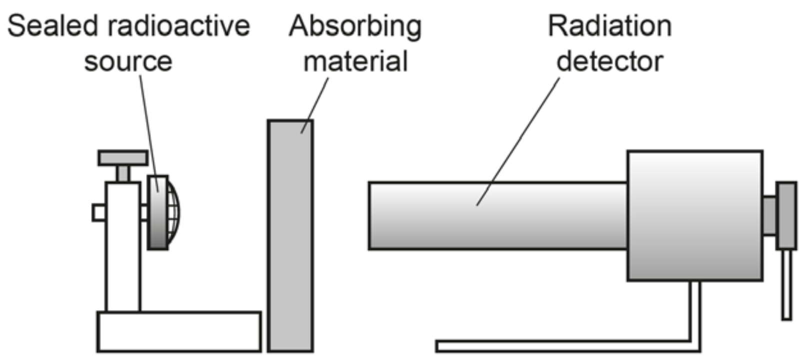


**Fig. 7.1**

This is Kareem's method:

- measure the count rate with no absorbing material
- measure the count rate with different absorbing materials placed between the source and the radiation detector.

Kareem plots his results on the bar chart in **Fig. 7.2**.

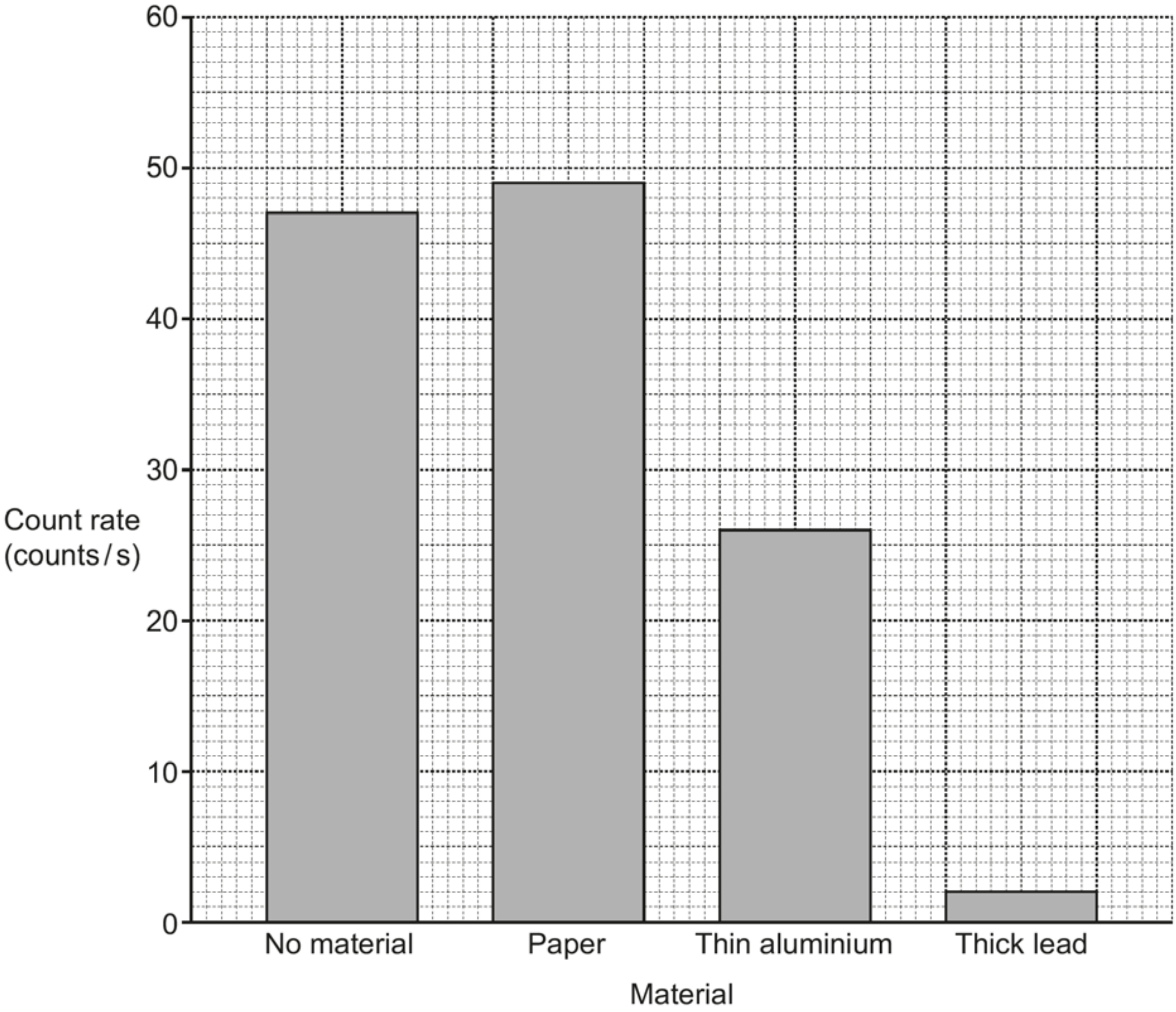


**Fig. 7.2**

**(b)** Suggest which type, or types of radiation the source emits.

Use the table and **Fig. 7.2** to explain your answer.

...........................................................................................................................

...........................................................................................................................

...........................................................................................................................

...........................................................................................................................

...........................................................................................................................

........................................................................................................................... **[4]**

The best responses here used the data as a starting point and then linked this to properties to decide on a type of radiation. Weaker responses simply stated facts about each type of radiation but did not clearly link these to the data.



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**Misconception**

? A common misconception was to state that the material was emitting the radiation. For example "paper emits alpha radiation" or "the graph shows paper releasing more than the thin aluminium".

## Question 8 (a)

**8** Oxygen gas can be stored in large metal cylinders.
On a hot day the temperature of the oxygen gas in a metal cylinder increases, but the volume of the cylinder does not change.

**(a)** Describe how the behaviour of the oxygen molecules in the cylinder changes as the temperature increases.

..........................................................................................................................................

..........................................................................................................................................

..........................................................................................................................................

.......................................................................................................................................... **[2]**

Most candidates knew that the molecules increased in speed and/or kinetic energy, but fewer described an increase in the rate of collisions. This again also highlights how few responses include any discussion about 'rate' or 'per unit time'.


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## Question 8 (b)

**(b)** State what happens to the pressure of the gas **and** use your answer to **(a)** to explain why this happens.

The pressure of the gas ..........................................................................................................

Explanation ..........................................................................................................................

..........................................................................................................................................

..........................................................................................................................................

..........................................................................................................................................

..........................................................................................................................................

..........................................................................................................................................

.................................................................................................................................... **[4]**

In this question candidates were expected to explain how a gas exerts a pressure using the kinetic particle model of a gas. A full explanation here would need to include the use of momentum change as the molecules collide with the walls of the container. Most candidates recognised that the pressure would increase but did not manage to explain why using ideas about gas molecules. Fewer still made any link between momentum change and force (leading to a pressure).


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## Question 8 (c) (i)

**(c)** Oxygen is also stored and used as a liquid.
The table shows some properties of oxygen.

| **Properties of oxygen** | |
|---|---|
| Boiling point | –183 °C |
| Specific latent heat of vapourisation | 213 kJ / kg |
| Specific heat capacity of oxygen gas | 920 J / kg °C |

Before liquid oxygen is stored, a large amount of energy must be transferred from the mas
of oxygen gas, to cool and liquify it.

**(i)** 1.7 MJ of energy is transferred from the mass of oxygen gas to reduce the temperatu
of the oxygen to its boiling point.

Calculate the mass of the oxygen gas.

Use the Data Sheet.

The initial temperature of the oxygen gas is 20 °C.

Mass = ...................................................... kg **[4]**

This was a multistage calculation that required candidates to first calculate the temperature change and then use the equation for specific heat capacity to calculate the mass. Many candidates who selected the correct equation did not attempt to calculate the temperature change and instead used one of the given temperatures. Some candidates incorrectly selected the equation for specific latent heat or tried to use both equations. Again, candidates who took the time to set out their response clearly generally scored well.


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## Question 8 (c) (ii)

**(ii)** The mass of oxygen gas calculated in **(c)(i)** is at its boiling point.

Calculate the energy that must be transferred from the mass of oxygen gas to liquify it.

Use the Data Sheet.

Energy = ........................................................ J **[3]**

This was generally more successful than the previous question. Although most candidates did not convert the specific latent heat of vaporisation from kJ/kg to J/kg.

## Question 9 (a)

**9** Uranium has a number of isotopes. The isotope uranium-234 is radioactive and decays to give an isotope of thorium.

**(a)** What are isotopes of an element?

..........................................................................................................................................

.................................................................................................................................... **[2]**

Some candidates here stated a different number of 'protons and neutrons' rather than referring to each in turn or stated that the number of neutrons is different to the number of protons. Candidates should be encouraged to try to separate different ideas in their answers and use punctuation where appropriate.

## Question 9 (b)

**(b)** Uranium-234 decays by emitting an alpha particle.

Complete the following equation for the decay of uranium-234 to thorium.

$$^{234}_{92}\text{U} \longrightarrow \,^{\cdots\cdots}_{\cdots\cdots}\text{Th} + \,^{\cdots\cdots}_{\cdots\cdots}\cdots\cdots$$

**[2]**

Most candidates could recall the mass number and atomic number of an alpha particle, but some candidates did not give the correct symbol.


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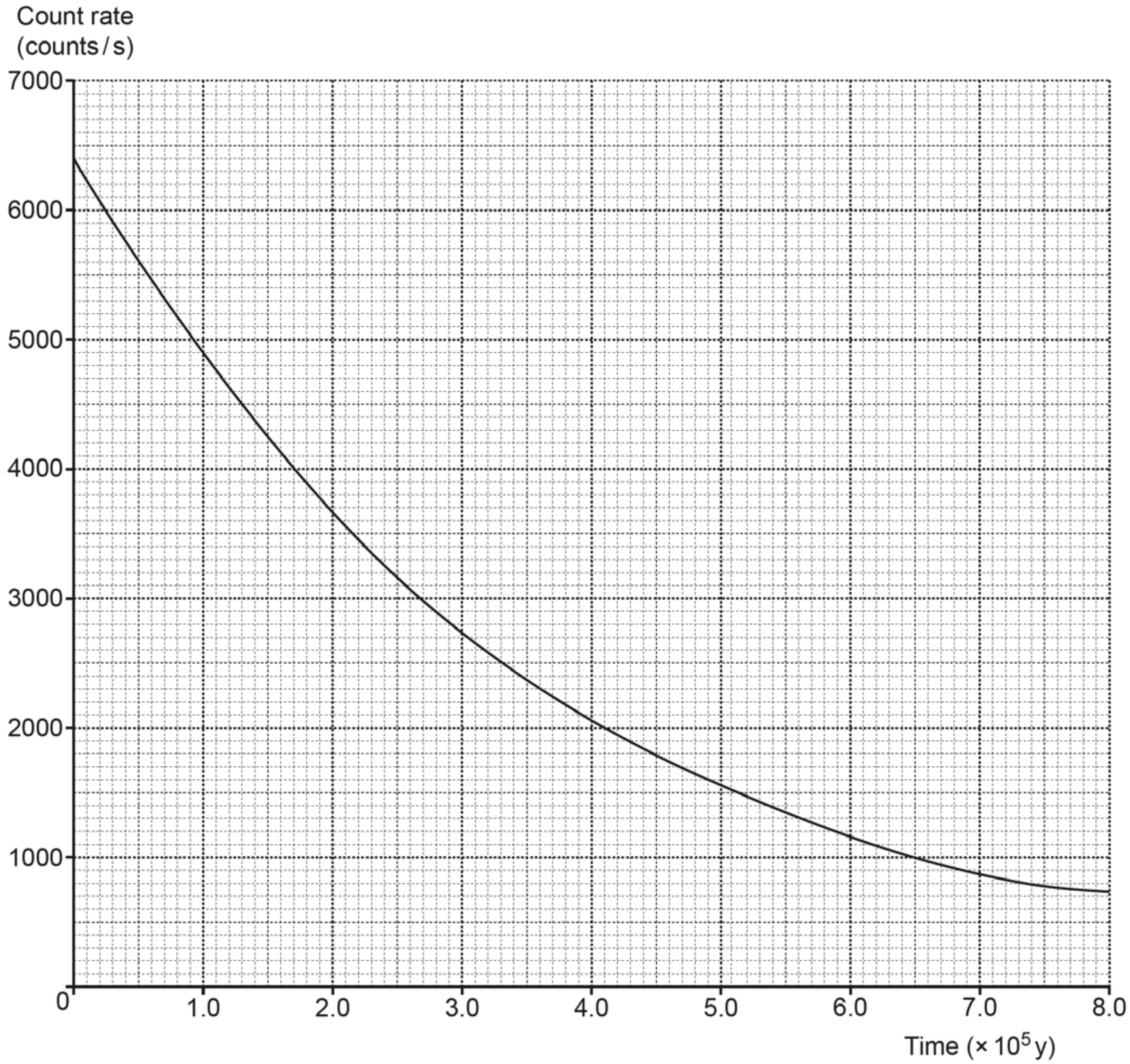
## Question 9 (c)

**(c)** The graph shows the decay of a sample of uranium-234.




Use the graph to determine the half-life of uranium-234.

Half-life = ................................................ years **[3]**

Many candidates scored full or partial marks here demonstrating a good understanding of half-life. A common error was to use the number at the top of the y-axis scale as a starting point, rather than where the data began.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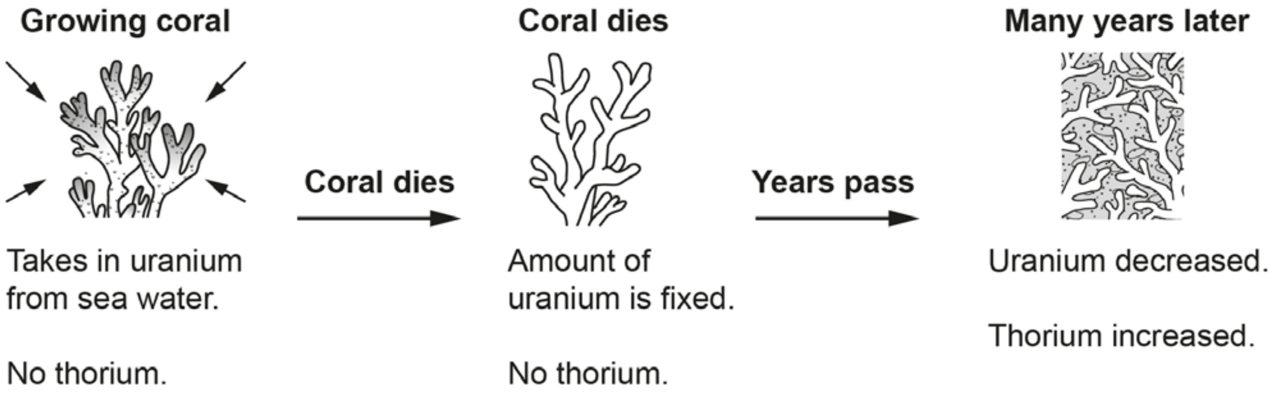
## Question 9 (d) (i)

**(d)** Ling is a geologist. She uses the decay of uranium-234 to thorium to find the age of rocks which are made of ancient coral. The method is shown in the diagram.




**(i)** After about ten uranium-234 half-lives have passed, this method of finding the age can no longer be used.

Suggest **one** reason why this method no longer works.

Use the graph.

..........................................................................................................................................

.......................................................................................................................................... **[1]**

Although many candidates had the correct idea here, some did not express it very clearly. The best responses linked the released radiation to background levels as a way to explain why it is difficult to measure.



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## Question 9 (d) (ii)

**(ii)** By measuring the amount of thorium in a sample, Ling calculates that 75% of the uranium-234 in the sample has decayed.

Calculate the age of the sample.

Use the graph or your answer to **(c)** to help.

Age = ................................................ years **[3]**

Many candidates had the correct idea here but used the incorrect percentage. A 75% reduction means 25% remains. Many candidates calculated a 75% count rate to determine an incorrect age.


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## Question 10 (a)

**10** Jane investigates the motion of a model car.
She records some data for her model car in a table:

| | |
|---|---|
| Initial velocity | 0 m / s |
| Final velocity | 1.9 m / s |
| Mass | 0.82 kg |
| Time | 3.8 s |
| Acceleration | 0.5 m / $s^2$ |

**(a)** Calculate the rate of change of momentum of the car.

Use the equation: rate of change of momentum = $\frac{\text{change in momentum}}{\text{time}}$

Use the Data Sheet.

Rate of change of momentum = ............................................ kgm / $s^2$ **[4]**

Many candidates correctly calculated the final momentum of the car, but many did not use that momentum to calculate the rate of change of momentum correctly. This seems to imply that many candidates did not correctly link the equation to the context of the question and therefore did not know how to determine the change in momentum.

## Question 10 (b)

**(b)** Calculate the force used to accelerate the car.

Use the Data Sheet.

Force = ...................................................... N **[3]**

This is a very familiar equation in physics and most candidates correctly used it to calculate the force.


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## Question 10 (c)

**(c)** Explain how your answers to **(a)** and **(b)** are related.

................................................................................................................................

................................................................................................................................ **[1]**

Few candidates correctly made the link between force and rate of change of momentum here

## Question 11 (a)

**11** An electrical conductor is placed in a magnetic field. There is a direct current passing through the conductor.

**(a)** **Fig. 11.1** shows a left hand.

Complete all the labels to show how you can use your left hand to determine the direction of the force on a conductor in a magnetic field.

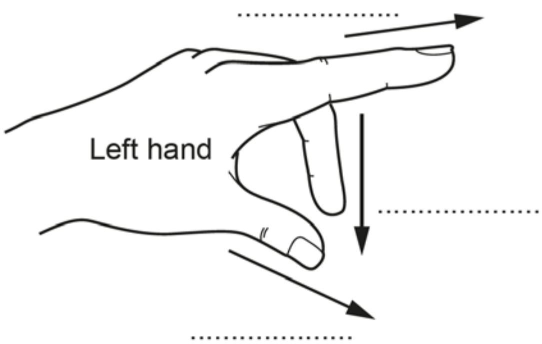


**Fig. 11.1**

**[2]**

Most candidates scored 1 mark here, with few candidates achieving both marks for getting all 3 labels correct. Question 11 was quite a low scoring question overall despite having the bulk of the marks coming from multiple choice style questions. This suggests that the candidates were in general less confident with this area of the specification.


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## Question 11 (b) (i)

**(b)** **Fig. 11.2** shows the conductor in the magnetic field between the north pole **N** and the south pole **S** of a bar magnet.

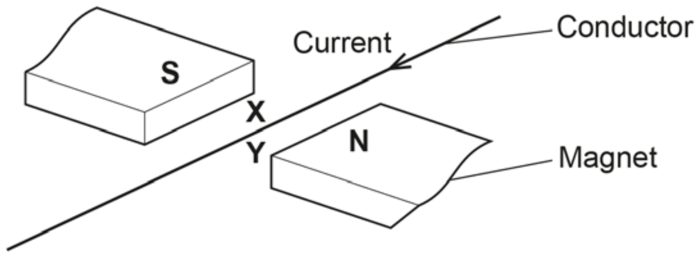


**Fig. 11.2**

**X** is a point directly above the conductor and **Y** is a point directly below the conductor.

**(i)** Complete the sentences to describe the behaviour of the conductor when the current is switched on.

Put a (ring) around each correct option.

The conductor moves towards **N / S / X / Y** when the current is switched on.

When both the current **and** the magnetic field directions are reversed, the conductor

**moves in the opposite direction / moves in the same direction / does not move**.

When both the current **and** the magnetic field strength are increased the movement of

the conductor is **decreased / increased / unchanged**.

**[2]**

Very few candidates achieved both marks on this question. When 1 mark was scored it was commonly for correctly selecting 'increased' from the final sentence. The final sentence tests the effect of variables on magnitude, whereas the first two test ideas about direction, linked to FLHR tested in part (a).



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## Question 11 (b) (ii)

**(ii)** The power supply to the conductor is changed from direct current (d.c.) to alternating current (a.c.).

What happens when the current is switched on?

Tick (✓) **one** box.

The conductor may vibrate about its rest position or appear not to move. ☐

The conductor does not vibrate. It moves further from its rest position. ☐

The conductor does not vibrate. It moves in the opposite direction. ☐

The movement of the conductor is the same as for d.c. ☐

**[1]**

This is a more difficult multiple choice question linked to the same part of the specification, but also linking to ideas about a.c. and d.c.


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## Question 11 (c)

**(c)** A rectangular coil is placed in a magnetic field, as shown in **Fig. 11.3**.

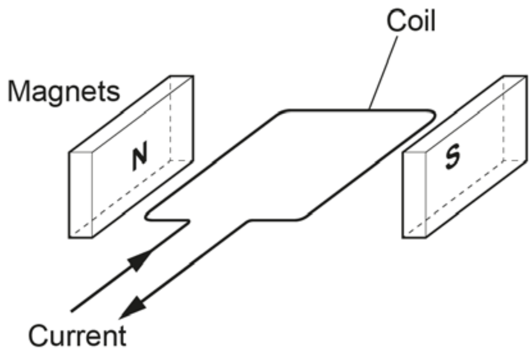


**Fig. 11.3**

- A d.c. current in the coil is switched on.
- The coil turns.

Explain why there is a turning effect on the coil.

.......................................................................................................................................

.......................................................................................................................................

.......................................................................................................................................

....................................................................................................................................... **[2]**

Very few candidates achieved any marks here. The best responses clearly referenced the force on the wires and linked it to Fleming's left hand rule. It was difficult for candidates to achieve marks without any reference to force. Candidates should be encouraged to use the word force when explaining why something is experiencing a change in its motion.


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## Question 11 (d)

**(d)** In a motor the coil is connected so that it continues to turn.

Complete the sentences about the energy transferred in the motor.

Use words from the list.

| | | | | |
|---|---|---|---|---|
| **chemical** | **current** | **electric** | **kinetic** | **light** |
| **magnetic** | **potential difference** | | **sound** | **thermal** |

When the motor is switched on:

Energy is transferred from the battery's ...................................... store.

Energy is transferred to the motor's ...................................... store and to the

...................................... store of the motor and the surroundings.

The amount of energy transferred depends on the ...................................... through the coil of the motor.

**[3]**

Candidates had to get at least two of these correct to achieve 1 mark. Many selected the wrong words; a common incorrect answer was sound for either the second or third gap. Sound is not a store of energy. A similar error was in selecting electric for the first gap, a battery is a chemical store of energy.

## Copyright information

Question 2: state from DUKES used to plot graph, DUKES chapter 5: statistics on electricity from generation through to sales, Published 26 July 2012. Last updated 25 July 2019. Copyright Dukes 5.1.1 https://www.gov.uk/government/statistics/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes Fuel input for electricity generation, 1970 to 2018 (DUKES 5.1.1)

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