AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 6.5.4.2.3

Newton's Third Law

Past-paper questions

Tier	**Higher**
Question groups	**2**
Available paper years	**2024–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

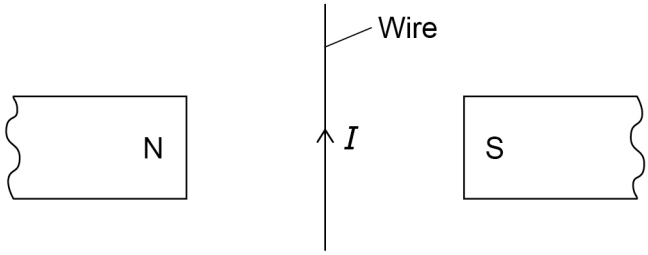
6.5.4.2.3 Newton's Third Law

Question 01

0 4 **Figure 6** shows two magnets and a wire.

There is a current in the wire.

Figure 6



0 4 . 1 A force acts on the wire in **Figure 6**.

What is the direction of the force on the wire?

[1 mark]

Tick (✓) **one** box.

- Into the page ☐
- Out of the page ☐
- To the left ☐
- To the right ☐

6.5.4.2.3 Newton's Third Law

Question 01 · continued

0 4 . 2 The length of the wire in the magnetic field between the magnets is 80 mm.

The current in the wire is 4.6 A.

The force on the wire is 0.092 N.

Calculate the magnetic flux density between the magnets.

Use the Physics Equations Sheet.

Give the unit.

[4 marks]

Magnetic flux density = _____ Unit _____

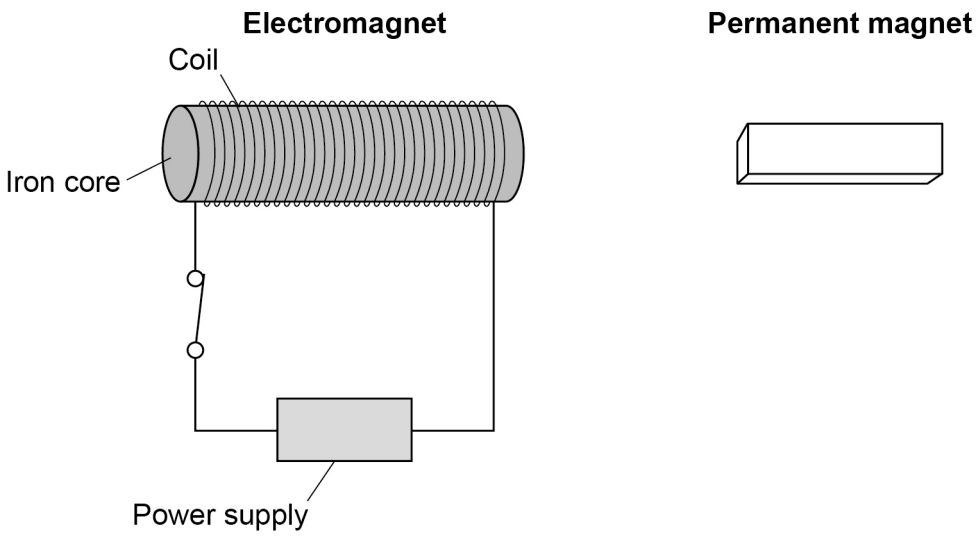
Question 4 continues on the next page

6.5.4.2.3 Newton's Third Law

Question 01 · continued

Figure 7 shows an electromagnet close to a permanent magnet.

Figure 7



0 4 . 3 The electromagnet exerts a force on the permanent magnet.

The permanent magnet exerts an equal and opposite force on the electromagnet.

Which law is this an example of?

[1 mark]

Tick (✓) **one** box.

Newton's first law ☐

Newton's second law ☐

Newton's third law ☐

6.5.4.2.3 Newton's Third Law

Question 01 · continued

0 4 . 4 Give **two** changes to the electromagnet that would increase the force exerted on the permanent magnet**.**

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 5 Give **two** changes to the electromagnet that would reverse the direction of the force exerted on the permanent magnet**.**

[2 marks]

1 _____

_____

2 _____

_____

10

6.5.4.2.3 Newton's Third Law

Question 02

0 1 In a dog-sled race, a team of dogs pull on a rope attached to a sled.

Figure 1 shows a dog-sled team.

Figure 1



Use the Physics Equations Sheet to answer questions **01.1** and **01.2**.

0 1 . 1 What equation links distance travelled, speed and time?

[1 mark]

Tick (✓) **one** box.

distance travelled = speed × time ☐

speed = time × distance travelled ☐

time = distance travelled × speed ☐

6.5.4.2.3 Newton's Third Law

Question 02 · continued

0 1 . 2 The longest dog-sled race in the world covers a distance of 1 500 000 m.

One team finished the race in a time of 670 000 s.

Calculate the average speed of this team during the race.

[3 marks]

Average speed = _____ m/s

0 1 . 3 At the start of the race, 6 dogs pulled on the rope.

The average forward force on the sled from **each** dog was 370 N.

The backwards force on the sled from friction was 520 N.

Calculate the resultant force on the sled.

[2 marks]

Resultant force = _____ N

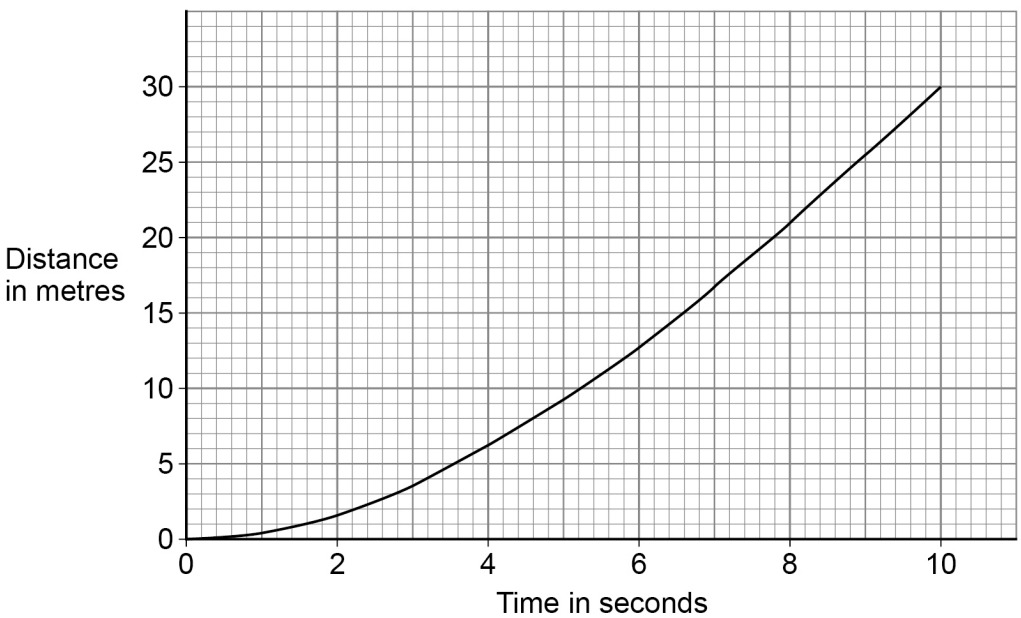
Question 1 continues on the next page

6.5.4.2.3 Newton's Third Law

Question 02 · continued

Figure 2 shows a distance–time graph for the sled at the start of the race.

Figure 2



0 1 . 4 What does the gradient of the graph in **Figure 2** represent?

[1 mark]

6.5.4.2.3 Newton's Third Law

Question 02 · continued

0 1 . 5 Later in the race, the sled moved at a constant speed along a flat, horizontal path.

What was the relationship between the size of the horizontal forces acting when the sled moved at a constant speed?

[1 mark]

Tick (✓) **one** box.

friction + air resistance < pull of the rope on the sled ☐

friction + air resistance = pull of the rope on the sled ☐

friction + air resistance > pull of the rope on the sled ☐

0 1 . 6 The rope exerted a force on the sled when the sled was moving.

What is the Newton's Third Law pair to the force of the rope on the sled?

[1 mark]

Tick (✓) **one** box.

The force of friction on the sled ☐

The force of the dogs on the rope ☐

The force of the sled on the rope ☐

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