

Name of the Student: \_\_\_\_\_

Max. Marks : 17 Marks

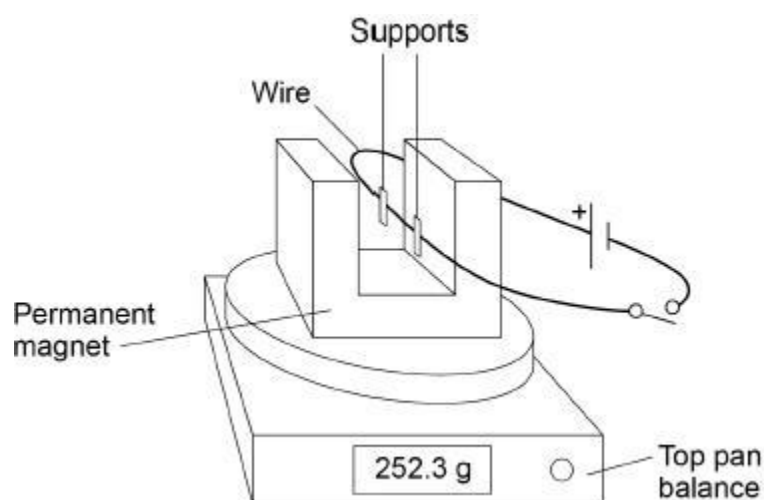
Time : 17 Minutes

**Q1.**

A student clamped a wire between the poles of a permanent magnet.

The student investigated how the force on the wire varied with the current in the wire.

The diagram below shows the equipment used.



The top pan balance was used to determine the force on the wire.

- (a) When the switch was closed the reading on the top pan balance increased.

Explain why the increased reading showed that there was an upward force on the wire.

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(2)

- (b) The table below shows the readings on the top pan balance with the switch open and with the switch closed.

Switch	Mass in grams
Open	252.3
Closed	254.8

Explain how the values in the table above can be used to determine the size of the force on the wire.

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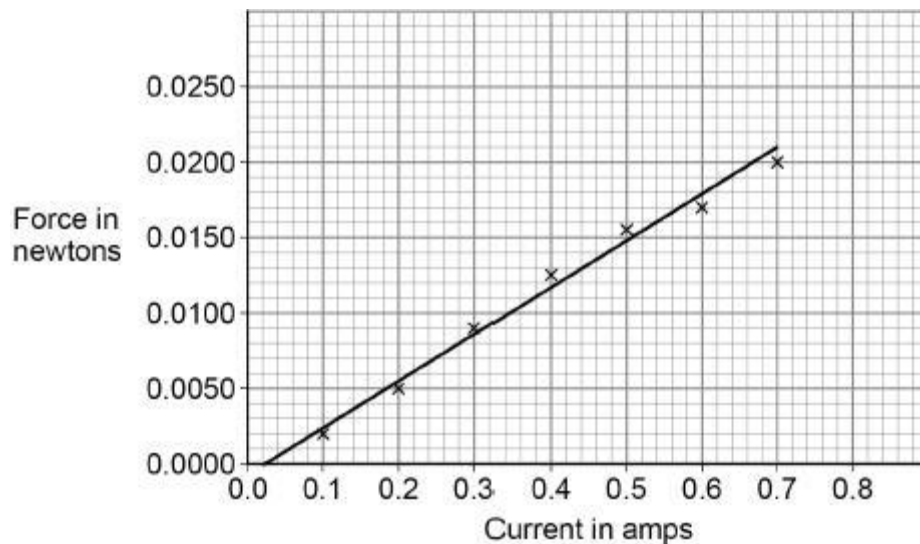
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(2)

- (c) The student varied the current in the wire and calculated the force acting on the wire.

The graph below shows the results.



The length of the wire in the magnetic field was 0.125 m

Determine the magnetic flux density.

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Magnetic flux density = \_\_\_\_\_ T

(4)

(Total 8 marks)

## Q2.

Some quantities are scalars and some are vectors.

- (a) Which of the following quantities are scalars?

Tick (✓) **two** boxes.

Displacement

☐

Distance

☐

Force

☐

Speed

☐

Velocity

☐

(2)

(b) Give the difference between a vector quantity and a scalar quantity.

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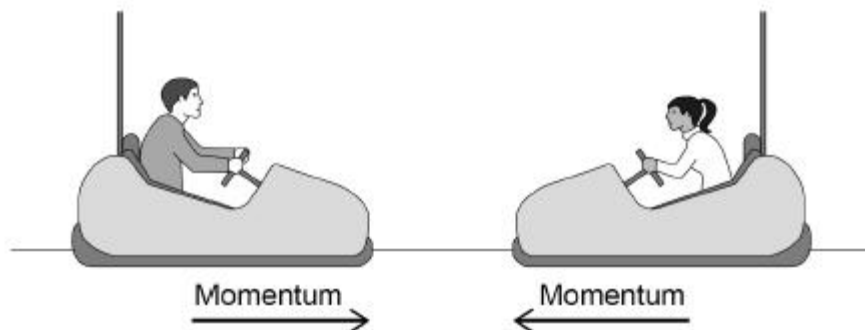
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(1)

Bumper cars are a fairground ride and are designed to bump into each other.

The diagram below shows two bumper cars moving towards each other.

The momentum of each bumper car is shown by an arrow.



(c) Give **two** factors that affect the momentum of each bumper car.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2)

(d) The bumper cars crash into each other and stop.

Explain why both bumper cars stop after the crash.

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(4)  
(Total 9 marks)