

GCSE Physics

Worksheet: Contact and non-contact forces

TIME 35 min	TOTAL 32 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
----------------	-------------------	-----------------------	----------------------------

Topics: Contact and non-contact forces

NAME	CLASS	DATE
------	-------	------

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

01

01.1

Which of these forces is a non-contact force?

Tick (✓) **one** box.

Air resistance	☐
Friction	☐
Magnetic force	☐
Tension	☐

[1 mark]

01.2

Name **two** other non-contact forces.

.....

.....

.....

.....

[2 marks]

0 1 . 3

Describe the difference between a contact force and a non-contact force.

.....

.....

.....

.....

[2 marks]

0 1 . 4

Force is a vector quantity.
What does this mean?

.....

.....

[1 mark]

0 2

0 2 . 1

Which **two** of these are contact forces?
Tick (✓) **two** boxes.

- Air resistance
- Electrostatic force
- Gravitational force
- Normal contact force
- Magnetic force

☐

☐

☐

☐

☐

[2 marks]

0 2 . 2

State whether friction is a contact force or a non-contact force.

.....

.....

.....

.....
[1 mark]

0 2 . 3 Give an example of a non-contact force acting between the Earth and the Moon.

.....

.....

[1 mark]

0 3

Table 1 shows four situations, each involving a force.

Table 1

Situation	Force involved
A fridge magnet holding a note to a steel door	Magnetic force
A book resting on a table	Normal contact force
Two balloons with the same electric charge pushed near each other	Electrostatic force
A skydiver falling through the air	Air resistance

0 3 . 1 Use Table 1 to identify the **two** non-contact forces.

.....

.....

.....

.....

[2 marks]

0 3 . 2 Explain how you decided which forces in Table 1 are non-contact forces.

.....

.....

.....

.....

[2 marks]

0 4

A kite-surfer stands on a board and is pulled across the sea by a large kite. The kite is attached to the kite-surfer by lines.

0 4 . 1

Name **one** contact force and **one** non-contact force that act on the kite-surfer.

.....

.....

.....

.....

[2 marks]

0 4 . 2

The weight of the kite-surfer is caused by an interaction between the kite-surfer and the Earth.

Describe the force that the kite-surfer exerts on the Earth as a result of this interaction.

.....

.....

.....

.....

[2 marks]

0 4 . 3

The kite lines exert a force of 450 N on the kite-surfer, pulling towards the kite. Give the size and direction of the force that the kite-surfer exerts on the kite lines.

.....

.....

.....

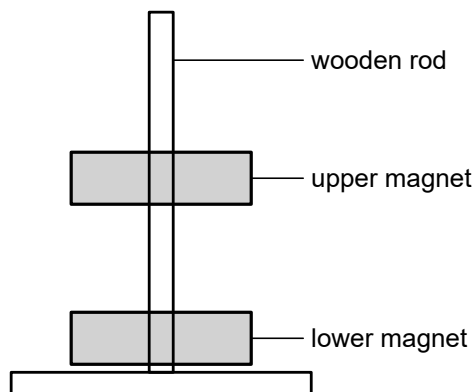
.....

[2 marks]

0 5

Figure 1 shows two ring magnets on a vertical wooden rod. The upper magnet floats above the lower magnet without touching it. Friction between the magnets and the rod is negligible.

Figure 1



0 5 . 1

Name the force that holds the upper magnet up.

.....

.....

.....

.....
[1 mark]

0 5 . 2

Explain why this force is described as a non-contact force.

.....

.....

[1 mark]

0 5 . 3

The weight of the upper magnet is 0.60 N. The upper magnet is stationary. Give the size and direction of the force that the lower magnet exerts on the upper magnet.

.....

.....

.....

.....

[2 marks]

0 5 . 4

Give the size and direction of the force that the upper magnet exerts on the lower magnet.

.....

.....

.....

.....

[2 marks]

0 5 . 5

A student pushes the upper magnet down a little and then lets go. The upper magnet moves back upwards.
Suggest why.

.....

.....

.....

.....

[2 marks]

0 6

A maglev (magnetic levitation) train uses magnets to float just above its track, without touching it. Magnets in the track also drive the train forwards, again without any contact between the train and the track.

0 6 . 1

Name the force that holds the train up.

.....

.....

.....

.....
[1 mark]

0 6 . 2

Suggest one advantage of using a non-contact (magnetic) force, instead of a contact force such as friction between wheels and a track, to drive the train forwards.

.....

.....

.....

.....

[2 marks]

0 6 . 3

Name one contact force that still acts on the maglev train as it moves.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Physics · Worksheet: Contact and non-contact forces · 32 marks

Question 1 (6 marks)

01.1 [1 mark]

Correct: Magnetic force

01.2 [2 marks]

Answer: Gravitational force (weight) and electrostatic force.

- gravitational force / weight / gravity (1)
 - electrostatic force (1)
-

01.3 [2 marks]

Answer: Contact forces act between objects that touch; non-contact forces act between objects that are separated.

- contact force: the objects are (physically) touching (1)
 - non-contact force: the objects are (physically) separated / not touching (1)
-

01.4 [1 mark]

Answer: It has magnitude and direction.

- force has magnitude (size) and direction (1)
-

Question 2 (4 marks)

02.1 [2 marks]

Correct: Air resistance; Normal contact force

02.2 [1 mark]

Answer: Contact.

- contact (1)
-

02.3 [1 mark]

Answer: Gravitational force.

- gravitational force / gravity (1)
-

Question 3 (4 marks)

03.1 [2 marks]

Answer: Magnetic force and electrostatic force.

- magnetic force (1)
 - electrostatic force (1)
-

03.2 [2 marks]

Answer: They act between objects that are not touching; the others act only because the objects touch.

- these forces act between objects that are physically separated (not touching) (1)
 - the other forces in Table 1 act only because the objects involved are touching (1)
-

Question 4 (6 marks)

04.1 [2 marks]

Answer: Contact: tension in the lines. Non-contact: weight (gravitational force).

- contact: tension (in the lines) / air resistance / drag / normal contact force (from the board) / friction (from the board) (1)
- non-contact: weight / gravitational force (1)

Notes: Do not accept upthrust or water resistance for the contact force (these act on the board, not on the kite-surfer).

04.2 [2 marks]

Answer: A gravitational force on the Earth, equal in size to the kite-surfer's weight and directed upwards towards the kite-surfer.

- a (non-contact) gravitational force on the Earth (1)
 - equal in size to the kite-surfer's weight and in the opposite direction / upwards (towards the kite-surfer) (1)
-

04.3 [2 marks]

Answer: 450 N, directed away from the kite.

- 450 (N) (1)
 - away from the kite / in the opposite direction (to the force on the kite-surfer) (1)
-

Question 5 (8 marks)

05.1 [1 mark]

Answer: Magnetic force (repulsion).

- magnetic (force) / magnetic repulsion (1)
-

05.2 [1 mark]

Answer: The magnets exert forces on each other without touching.

- the magnets are (physically) separated / do not touch, but still exert a force on each other (1)
-

05.3 [2 marks]

Answer: 0.60 N upwards.

- 0.60 (N) (1)
 - upwards (1)
-

05.4 [2 marks]

Answer: 0.60 N downwards.

- 0.60 (N) (1)
 - downwards (1)
-

Notes: Allow ECF for the size from the previous part.

05.5 [2 marks]

Answer: Closer magnets repel more strongly, so the magnetic force exceeds the weight and there is a resultant upward force.

- the (repulsive) magnetic force increases as the magnets get closer together (1)
 - so the magnetic force is greater than the weight / there is a resultant force upwards (1)
-

Question 6 (4 marks)

06.1 [1 mark]

Answer: Magnetic force.

- magnetic force / magnetic repulsion (1)

06.2 [2 marks]

Answer: With no contact there is no friction at the track, so less energy is dissipated by heating and there is less wear.

- there is no friction between the train and the track (no contact) (1)
- so less energy is dissipated to the surroundings by heating / there is less wear on the train and track (lower maintenance, higher speeds possible) (1)

06.3 [1 mark]

Answer: Air resistance.

- air resistance / drag (1)
-