

Combining forces and drawing force diagrams

Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test covers types of force, free-body diagrams, resultant forces along a line and at right angles, and equilibrium. Show every step, give directions and include units. Calculators are allowed.

Level: Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** GCSE P5

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Resultant force (2 marks)

- Define the resultant force on an object. (1 mark)
- State what you can say about the motion of an object when the resultant force is zero. (1 mark)

Question 2 Weight and reaction (3 marks)

A bag has a mass of 3.5 kg and rests on a table. Use $g = 9.8 \text{ N/kg}$.

- Write the equation for weight and calculate the weight. (2 marks)
- State the reaction force of the table on the bag. (1 mark)

Question 3 Forces on a line (3 marks)

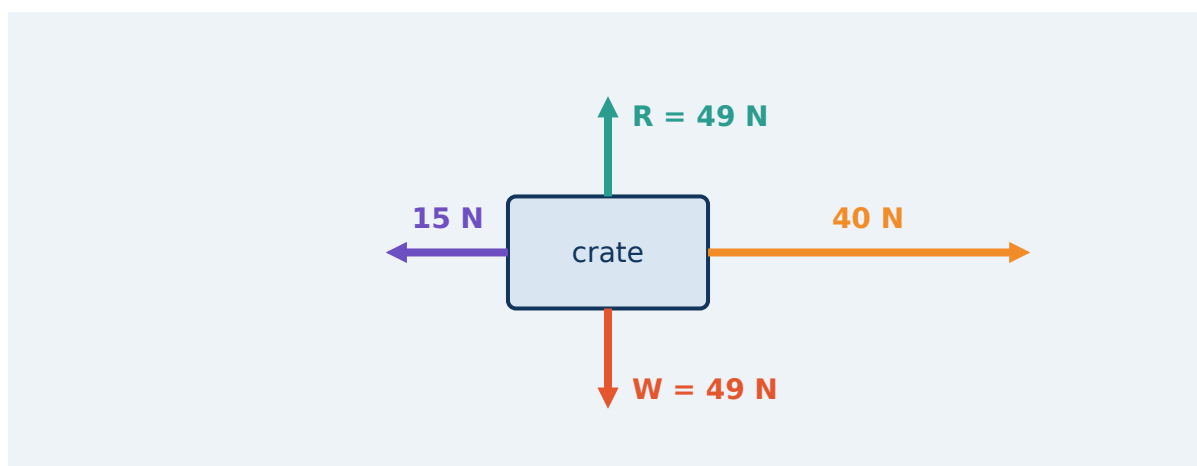
A trolley is pushed with 8.0 N to the right and 5.0 N to the left at the same time.

- Calculate the resultant force and give its direction. (2 marks)
- The 5.0 N force is removed. Calculate the new resultant. (1 mark)

Question 4 Reading a free-body diagram (3 marks)

The diagram shows the forces on a crate.

- Calculate the resultant horizontal force. (1 mark)
- State the resultant vertical force. (1 mark)
- Describe the effect on the crate. (1 mark)



Forces on a crate.

Question 5 Perpendicular forces (3 marks)

A ring is pulled with 9.0 N east and 12 N north. Calculate the resultant force and its direction as an angle north of east. (3 marks)

Question 6 Constant speed (2 marks)

A cyclist rides at constant speed on a flat road. Explain what this tells you about the driving force and the resistive forces. (2 marks)

Question 7 Hanging lamp (2 marks)

A lamp of mass 2.0 kg hangs at rest from a cord. Calculate the tension in the cord. (2 marks)

Question 8 Non-contact forces (2 marks)

Name two forces that act without the objects touching and give one example of each. (2 marks)