Resultant force and momentum

Physics Paper 2 calculations | AQA Combined Science 8464 and AQA GCSE Physics 8463 | 12 questions, 30 marks

GCSE science calculations

Scan for the solutions

Equations for this topic (cover this box to practise recalling them)

- resultant force = mass × acceleration learn this one
- momentum = mass × velocity learn this one
- acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$ learn this one

Name: _____ **Date:** _____ **Score:** _____ **/ 30**

1 A car has a driving force of 2400 N forwards. The total resistive force on the car is 900 N backwards.

Calculate the resultant force on the car.

(1 mark)

Answer _____

2 A loaded supermarket trolley has a mass of 30 kg. It accelerates at 1.5 m/s^2.

Calculate the resultant force on the trolley.

(2 marks)

Answer _____

3 **Higher tier**

A rugby player of mass 70 kg runs at a velocity of 6 m/s.

Calculate the momentum of the player.

(2 marks)

Answer _____

4 In a Year 10 practical, a trolley of mass 250 g accelerates down a runway at 0.8 m/s^2.

Calculate the resultant force on the trolley.

(2 marks)

Answer _____

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5 A train carriage has a mass of 32 000 kg. It accelerates at 0.6 m/s^2.

Calculate the resultant force on the carriage. Give your answer in kilonewtons (kN).

(3 marks)

Answer _____

6 **Higher tier**

A cricket ball of mass 160 g is bowled at a velocity of 30 m/s.

Calculate the momentum of the ball.

(2 marks)

Answer _____

7 A cyclist and her bike have a total mass of 80 kg. The resultant force on them is 360 N.

Calculate their acceleration.

(2 marks)

Answer _____

8 A small car has a driving force of 1800 N. The resistive forces on it total 600 N. The car accelerates at 0.8 m/s^2.

Calculate the mass of the car.

(3 marks)

Answer _____

9 **Higher tier**

A car of mass 1200 kg has a momentum of 18 000 kg m/s.

Calculate the velocity of the car.

(2 marks)

Answer _____

10 A car of mass 1400 kg speeds up from rest to 18 m/s in 6.0 s.

Calculate the resultant force on the car. Show your working.

(3 marks)

Answer _____

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11 An e-scooter and its rider have a total mass of 100 kg. They speed up from rest to 7.0 m/s in 5.0 s. The resistive force on them is 40 N.

Calculate the driving force from the motor. Show your working.

(4 marks)

Answer _____

12 **Higher tier**

In a Year 11 practical, trolley A has a mass of 0.80 kg and moves at 0.50 m/s. It collides with trolley B, which has a mass of 1.20 kg and is not moving. The trolleys stick together and move off in the same direction that A was moving.

Momentum is conserved in the collision.

Calculate the velocity of the trolleys just after the collision. Show your working.

(4 marks)

Answer _____

End of questions | Total 30 marks

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