PQ 8e Q

Q1

A 4.0×10^3 kg train, moving at 4.5 m s^{-1} collides, and couples with a stationary carriage. They move at 2.0 m s^{-1}. Find the carriage's mass.

Q2

A 2.5 g bullet, moving at 300 m s^{-1} is fired into a 20 kg bale of hay. The bullet embeds in the hay. Calculate the speed of the hay after being hit.

Q3

A 10 kg child is sitting in a 25 kg shopping trolley when Dad throws a 2.0 kg packet of rice into the trolley at 2.5 m s^{-1}. Calculate the speed of the trolley as it rolls down the aisle.

Q4

A 5.0 kg cart is rolling at 1.25 m s^{-1} when it runs into, and couples with a 2.0 kg cart moving at 0.5 m s^{-1} in the same direction. Calculate the speed at which the carts now move.

Q5

A coal truck of mass 1.5 tonnes carries a load of 7.5 tonnes of coal. It is moving at 0.6 m s^{-1} when it runs into, and couples with a stationary empty truck. The combination moves at 0.54 m s^{-1}. Calculate the mass of the empty truck.

Q6

A 450 g toy train engine is moving at 30 cm s^{-1} when it collides, and couples with a 200 g carriage moving at 15 cm s^{-1} in the same direction. Calculate their combined speed.

Q7

A 750 kg car moving at 4.0 m s^{-1} collides with a 500 kg car moving in the same direction at 2.0 m s^{-1}. They stick together. Calculate the speed at which they move.

Q8

A 500 g toy engine pulls four 300 g carriages. They are moving at 0.3 m s^{-1} when they run into, and couple with, two identical carriages moving at 0.15 m s^{-1} in the same direction. Calculate the speed of the combination.

Q9

A 2 tonne truck moving at 16.0 m s^{-1} runs into the back of a 1200 kg car moving at 10 m s^{-1}. At what speed does the truck push the car along?

Q10

A truck moving at 15 m s^{-1} runs into the back of a 750 kg car moving at 8 m s^{-1}. The truck pushes the car at 12 m s^{-1}. Find the mass of the truck.