

5. Insert these words into the four blanks of the sentence: mass, momentum, acceleration, time, impact, weight, impulse, and force. (Not every word will be used.)

In a collision, an object experiences a(n) force acting for a certain amount of time and which is known as a(n) impulse; it serves to change the momentum of the object

6. A(n) impulse causes and is equal to a change in momentum.  
 a. force      b. impact      c. impulse      d. collision

7. A 1000 kg car is moving at 20 m/s. The momentum of the car is:

$$P = mv \quad 20,000 \text{ Kg} \cdot \text{m/s}$$

8. The momentum of a car is 30,000 kg m/s. The mass of the car is 1500 kg. What is the speed of the car?

$$P = mv \rightarrow v = \frac{P}{m} = \frac{30,000 \text{ Kg} \cdot \text{m/s}}{1,500 \text{ Kg}} = 20 \text{ m/s}$$

9. The momentum of a car is 50,000 kg m/s. The speed of the car is 25.0 m/s. What is the mass of the car?

$$P = mv \rightarrow m = \frac{P}{v} = \frac{50,000 \text{ Kg} \cdot \text{m/s}}{25 \text{ m/s}} = 2000 \text{ Kg}$$

10. A ball was hitting by a bat. The impact force is 250 N, and the contact time is 0.2 s. What is the impulse received by the ball?

$$\text{Impulse} = f \Delta t \rightarrow 250 \text{ N} \cdot 0.2 = 50 \text{ N}$$

11. A 1200 kg car was crashed into a wall. The impulse is 4000 N-s and the impact time is 0.5 s. What is the impact force on the car?

$$\text{Impulse} = ft \rightarrow \frac{\text{Impulse}}{t} = f = \frac{4000 \text{ N} \cdot \text{s}}{0.5} = 8000 \text{ N}$$

12. A 1000 kg car was crashed into a garden and stopped. The impulse is 4000 N-s and the impact force is 2000 N. How long it takes for the car to stop?

$$t = \frac{\text{Impulse}}{\text{force}} \rightarrow \frac{4000 \text{ N} \cdot \text{s}}{2000 \text{ N}} = 2 \text{ s}$$