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:

$P = mv$ $20,000 \ kg \cdot m/s$

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?

$P = mv \rightarrow v = \dfrac{P}{m} = \dfrac{30,000 \ kg \cdot m/s}{1500 \ kg} = 20 \ m/s$

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?

$P = mv \rightarrow m = \dfrac{P}{v} = \dfrac{50,000 \ kg \cdot m/s}{25 \ m/s} = 200 \ kg$

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?

$Impulse = f \Delta t \rightarrow 250 \ N \cdot .2 = 50 \ N$

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?

$Impulse = ft \rightarrow \dfrac{Impulse}{t} = f = \dfrac{4000 \ N}{.5} \ 8000 \ N$

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?

$t = \dfrac{Impulse}{force} \rightarrow \dfrac{4000 \ N}{2000 \ N} = 2 \ s$