

CLASS – IX
UNIT - FORCE & LAWS OF MOTION

- Q.1. A force of 5N gives a mass m_1 an acceleration of 8 m/s^2 and a mass m_2 an acceleration of 24 m/s^2 . What acceleration would it give if both the masses are tied together?
- Q.2. A steam engine of mass $3 \times 10^4 \text{ kg}$ accelerates two wagons each of mass $2 \times 10^4 \text{ kg}$ through 0.2 m/s^2 . Neglecting frictional forces calculate (i) the force exerted by the engine, and (ii) the force experienced by each wagon.
- Q.3. Two blocks made of different metals identical in shape and size are acted upon by equal forces, which cause them to slide on a horizontal surface. The acceleration of the second block is found to be 5 times that of the first. What is the ratio of the mass of the second to the first?
- Q.4. Calculate the force required to impart to a car a velocity of 30 m/s in 10 seconds. The mass of the car is 1500 kg .
- Q.5. In order to gain a speed 12 m/s , how long should a force of 30 N be exerted on a body of mass 5 kg ?
- Q.6. A bullet of mass 25 g traveling with a velocity of 10 m/s penetrates a sand bag and comes to rest in 0.05 s . Find (i) the distance through which it penetrates in the sand bag, and (ii) the value of the retarding force of the sand bag.
- Q.7. An anti-aircraft gun fires a shell of mass 2.5 kg such that it leaves the barrel with a velocity of 540 km/h . if the length of the barrel is 3 m . Find (i) acceleration inside the barrel, and (ii) force acting on the shell.
- Q.8. A man in a circus show jumps from a height of 10 m and is caught by a net spread below him. The net sags down 2 m due to his impact. Find out the average force exerted by the net on the man to stop his fall. Take the mass of the man to be 60 kg and consider the value of acceleration during his free fall as 10 m/s^2 .
- Q.9. A shell of mass 0.02 kg is fired by a gun of mass 100 kg . If the muzzle speed of the shell is 80 m/s , what is the recoil speed of the gun?
- Q.10. A spaceship weighs 2000 kg . Its engine fires for 20 s . if the initial velocity of rocket is 40 km/s and the thrust developed by its engine is $100,000 \text{ N}$, find the final velocity of space ship and distance covered by it.
- Q.11. A bullet leaves a rifle with a velocity of 100 m/s and the rifle (mass= 2.5 kg) recoils with a velocity of 1 m/s . Find the mass of the bullet.