

# Home assignment

1. A motor car of mass of 1200 kg is moving along a straight line with a uniform velocity of 90 km/h. Its velocity is slowed down to 18 km/h in 4 s by an unbalanced external force.

Ans  $\Delta p = mv - mu$   
 $\Delta p = 1200 \times 5 - 1200 \times 25 = -24000 \text{ kg m/s}$

$$v = u + at$$

$$5 = 25 + a \times 4$$

$$a = -5 \text{ m/s}^2$$

2. mass,  $m = 100 \text{ kg}$

Time interval,  $\Delta t = 10 \text{ s}$

(i) Distance travelled in next 5 sec  
 $d = 100 \text{ m}$

Thus, velocity acquired by body

$$v = \frac{d}{t} = \frac{1000}{5} = 200 \text{ m/s}$$

Acceleration produced by the force

$$a = \frac{v}{\Delta t} = \frac{20}{10} = 2 \text{ m/s}^2$$

iii Magnitude of force,  $F = ma = 100 \text{ kg} \times 2 \text{ m/s}^2 = 200 \text{ N}$

3 m(c-v-u) The rate of change momentum. The unit of force is so chosen that the value  $F = ma$

4 State Newton's second law of motion and shows that the first law of the motion can be mathematically. Hence from the second laws of motion, we get force is the product of mass and acceleration  $F = ma$