

Q1:

**Sol.** Given Initial velocity ( $u$ ) =  $5 \text{ ms}^{-1}$ , Final velocity ( $v$ ) = 0, Time ( $t$ ) = 2 s, Acceleration ( $a$ ) = ?

Using  $v = u + at$ , we have

$$0 = 5 + a \times 2$$

This gives  $-2a = 5$

$$\text{or } a = -\frac{5}{2} = -2.5 \text{ m s}^{-2}$$

Therefore, force required to stop the car

$$F = ma = 1000 \text{ kg} \times (-2.5 \text{ m s}^{-2}) \\ = -2500 \text{ N}$$

Also, force required to stop the truck

$$F = m \times a \\ = 10000 \text{ kg} \times (-2.5 \text{ m s}^{-2}) \\ = -25000 \text{ N}$$

Negative sign in both the forces indicates a retarding force.

(c) Given  $F = 50 \text{ N}$ ,  $m = 200 \text{ kg}$ ,  $u = 15 \text{ m s}^{-1}$ ,  $t = ?$ ,  
 $S = ?$ ,  $v = 0$

The acceleration of the body is obtained from  $F = ma$  or  $a = F/m = 50/200 = -0.25 \text{ m s}^{-2}$

(Negative sign as the force is the retarding force)

Now, using  $v = u + at$ , we have

$$t = (v - u)/a = (0 - 15)/-0.25 = 60 \text{ s}$$

Also, distance travelled is obtained from

$$S = ut + \frac{1}{2}at^2$$

$$S = 15 \times 60 + \frac{1}{2} \times -0.25 \times (60)^2 \\ = 450 \text{ m}$$

**Q3: a)** Position of body will change due to unbalanced forces.. As it will produce acceleration in the body.

**b)** Balanced forces can deform the body, which means these can change the shape of body

**c)** The forces will be unbalanced.

### **Answers of Chemistry**

Ans1 (i) Homogeneity: Soda water is a solution and as such it can be differentiated based on the property of homogeneity.

(ii) Filtration: Muddy water is a heterogeneous mixture and can be separated by filtration

(iii) Tyndall effect: Milk is a colloid and exhibits the property of Tyndall effect

Ans2 Hydrogen Sulphide gas -by smell of rotten eggs

Hydrogen gas – by pop sound

Ans3 I Because milk is a colloidal solution and would show Tyndall effect.

II Salt solution is a true solution and would not scatter light.

III Soap solution and ink solution.

IV Tyndall effect is observed when sunlight passes through the canopy of a dense forest