

**SUBJECT:- PHYSICS**

**CLASS:- IXTH**

**DATE:- 11/05/XXI**

**SUBJECT TEACHER:- MR. NEEL NIRANJAN**

**CHAPTER 1. (MOTION)(BASED ON NCERT PATTERN)**

**1. A bus starting from rest moves with a uniform acceleration of  $0.1 \text{ m s}^{-2}$  for 2 minutes. Find (a) the speed acquired, (b) the distance travelled.**

**Answer:** Initial speed of the bus,  $u = 0 \text{ m/s}$

Acceleration,  $a = 0.1 \text{ m/s}^2$

Time taken,  $t = 2 \text{ minutes} = 120 \text{ s}$

(a)  $v = u + at$

$$v = 0 + 0.1 \times 120$$

$$v = 12 \text{ ms}^{-1}$$

(b) According to the third equation of motion,  $v^2 - u^2 = 2as$

$s$  is the distance covered by the bus

$$(12)^2 - (0)^2 = 2(0.1) s$$

$$s = 720 \text{ m}$$

Speed acquired finally by the bus is  $12 \text{ m/s}$ .

Distance travelled by the bus is  $720 \text{ m}$ .

**2. A train is travelling at a speed of  $90 \text{ km h}^{-1}$ . Brakes are applied so as to produce a uniform acceleration of  $-0.5 \text{ m s}^{-2}$ . Find how far the train will go before it is brought to rest.**

**Answer:** Initial speed of the train,  $u = 90 \text{ km/h} = 25 \text{ m/s}$  ( $1 \text{ km/hr} = 5/18 \text{ m/s}$ )

Final speed of the train,  $v = 0$  (finally the train comes to rest and its velocity becomes 0), Acceleration =  $-0.5 \text{ m s}^{-2}$

According to third equation of motion:

$$v^2 = u^2 + 2as$$

$$(0)^2 = (25)^2 + 2(-0.5)s$$

Where, s is the distance covered by the train

$$s = \frac{25^2}{2(0.5)} = 625 \text{ m}$$

The train will cover a distance of 625 m before coming to rest.

**3. A trolley, while going down an inclined plane, has an acceleration of  $2 \text{ cm s}^{-2}$ . What will be its velocity 3 s after the start?**

**Answer:** Initial Velocity of the trolley,  $u = 0 \text{ cm s}^{-1}$

Acceleration,  $a = 2 \text{ cm s}^{-2}$

Time,  $t = 3 \text{ s}$

It is known that final velocity,  $v = u + at = 0 + 2 \times 3 \text{ cm s}^{-1}$

Therefore, the velocity of train after 3 seconds is  $6 \text{ cm s}^{-1}$

**4. A racing car has a uniform acceleration of  $4 \text{ m s}^{-2}$ . What distance will it cover in 10 s after start?**

**Answer:** Initial Velocity of the car,  $u = 0 \text{ m s}^{-1}$

Acceleration,  $a = 4 \text{ m s}^{-2}$ , Time,  $t = 10 \text{ s}$

We know Distance,  $s = ut + \frac{1}{2}at^2$

Therefore, Distance covered by car in 10 second =  $0 \times 10 + \frac{1}{2} \times 4 \times 10^2$

=  $0 + \frac{1}{2} \times 4 \times 10 \times 10 \text{ m} = \frac{1}{2} \times 400 \text{ m}$

= 200 m