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**SUBJECT:-** PHYSICS

CLASS:- IXTH

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## **CHAPTER 3. (GRAVITATION)**

### **Question 40:**

A stone is dropped from a height of 20 m. (i) How long will it take to reach the ground ? (ii) What will be its speed when it hits the ground ? (g =10 m/s<sup>2</sup>) Solution :

Height, s=20m Initial velocity, u=0 Acceleration due to gravity, g=10m/s<sup>2</sup> Final velocity, v=? Time taken, t=?

(i) Using relation,

$$s = u t + \frac{1}{2} gt^{2}$$

$$20 = 0 x t + \frac{1}{2} x 10 x t^{2}$$

$$20 = 0 + 5 t^{2}$$

$$t^{2} = \frac{20}{5} = 4$$

$$t = \sqrt{4} = 2 s$$
(ii) For a freely falling body:  

$$v^{2} = u^{2} + 2gh$$

$$= (0)^{2} + 2 x (10) x (20)$$
So,  $v^{2} = 400$ 

$$v = \sqrt{400} = 20 \text{ m/s}$$

The speed of stone when it hits the ground will be 20m/s.

# **Question 41:**

An object has mass of 20 kg on earth. What will be its (i) mass, and (ii) weight, on the moon ? (g on moon =  $1.6 \text{ m/s}^2$ ). Solution :

(i) Its mass will be 20 kg as mass is a constant quantity.

(ii)Weight,  $W = m \times g = 20 \times 1.6 = 32N$