



Subject: Physics

Test: 03 Wks

Class: ICS (phy) [Part 1]

Date: 20-11-24

"Subjective Type"

Question: 02

(vi)

Critical Velocity:

As,

$$v = \sqrt{gR} \quad \therefore g = 9.8 \text{ ms}^{-2} \quad \therefore R = 6.4 \times 10^6 \text{ m}$$

$$v = \sqrt{6.4 \times 10^6 \times 9.8} \Rightarrow \boxed{v = 7.9 \text{ ms}^{-1}}$$

This is also called **Critical velocity**. This velocity is very close to earth. Earth i.e. its height is very small as compared to the earth radius.

(vii)

Data:

$$S = 2.50 \text{ m}$$

$\theta = ?$: **Find**

$$r = 3.8 \times 10^8 \text{ m}$$

Solution:

$$S = r\theta$$

$$\theta = \frac{S}{r} = \frac{2.50}{3.8 \times 10^8} \Rightarrow \boxed{6.6 \times 10^{-9} \text{ radian} \approx \theta}$$

(viii)

Data:

$$R = 1.74 \times 10^6 \text{ m}$$

$$r = 3.85 \times 10^8 \text{ m}$$

Find:

$$L_s = ?$$

$$\therefore L_s = I\omega$$

$$L_o$$

$$\therefore L_o = Mvr^2$$

Solution:

$$L_s = I\omega$$

Therefore, $L_o = Mvr$

$$\therefore L_s = \frac{2}{5} MR^2 \omega \quad \text{--- (1)}$$

$$L_o = Mvr \cdot r$$

$$L_o = Mr^2 \omega \quad \text{--- (2)}$$

$$\text{Now, } L_o = Mvr$$

Divide eq. (1) and eq. (2)

$$\text{But, } v = r\omega$$



$$\frac{L_s}{L_o} = \frac{2/5 R^2}{r^2}$$

Put values in
R.H.S:

$$\frac{L_s}{L_o} = \frac{2}{5} \left[\frac{1.74 \times 10^6}{3.85 \times 10^8} \right]^2$$

$$\frac{L_s}{L_o} = \frac{2}{5} (0.2025 \times 10^{-4})$$

$$\frac{L_s}{L_o} = 0.081 \times 10^{-4}$$

$$\frac{L_s}{L_o} = 8.1 \times 10^{-6}$$