

**Answer on Question#37421 – Physics - Mechanics**

$V_1 = 11.2 \frac{\text{km}}{\text{s}}$  – escape speed from Earth with mass  $M_{\text{Earth}}$  and radius  $r$ ;

$V_2$  – escape speed from Earth with mass  $2M_{\text{Earth}}$  and radius  $r$ ;

Formula for the escape speed ( $G$  – universal gravitational constant):

$$V_1 = \sqrt{\frac{2GM_{\text{Earth}}}{r}} \quad (1)$$

$$V_2 = \sqrt{\frac{2G \cdot (2M_{\text{Earth}})}{r}} \quad (2)$$

(2)  $\div$  (1):

$$\frac{V_2}{V_1} = \sqrt{\frac{2G \cdot (2M_{\text{Earth}})}{r}} \cdot \sqrt{\frac{r}{2GM_{\text{Earth}}}} = \sqrt{2}$$

$$V_2 = \sqrt{2}V_1 = \sqrt{2} \cdot 11.2 \frac{\text{km}}{\text{s}} = 15.8 \frac{\text{km}}{\text{s}}$$

**Answer:** escape speed from Earth with mass  $2M_{\text{Earth}}$  is equal to  $15.8 \frac{\text{km}}{\text{s}}$ .