Question:

7 Given that the mass and radius of Jupiter are respectively 1.90×10^{27} kg and 7.15×10^4 km, calculate the escape velocity from the surface of the planet.

Answer:

If the kinetic energy of an object launched from the Jupiter were equal in magnitude to the potential energy, then it could escape from the Jupiter:

$$\frac{mv^2}{2} = \frac{GMm}{r}$$

where M is mass of Jupiter, R is radius of Jupiter, v is escape velocity.

Escape velocity equals:

$$v = \sqrt{\frac{2GM}{r}} = 59.5 \frac{km}{s}$$

Answer: $59.5 \frac{km}{s}$