

## Answer on Question 67588, Physics, Other

### Question:

A golf ball of mass of 45 g is dropped from the low orbit of the Earth (an altitude of 1000 km). Assuming it was initially at rest with respect to the Earth and neglecting the air resistance, answer the following:

- With what speed does the golf ball hit the Earth's surface?
- With what kinetic energy does it hit?

### Solution:

a) We can find the speed of the golf ball when it hit the Earth's surface from the law of conservation of energy:

$$KE = PE,$$

$$\frac{1}{2}mv^2 = mgh,$$

$$v = \sqrt{2gh} = \sqrt{2 \cdot 9.8 \frac{m}{s^2} \cdot 10^6 m} = 4427 \frac{m}{s}.$$

b) By the definition of the kinetic energy, we get:

$$KE = \frac{1}{2}mv^2 = \frac{1}{2} \cdot 0.045 kg \cdot \left(4427 \frac{m}{s}\right)^2 = 440962 J.$$

### Answer:

a)  $v = 4427 \frac{m}{s}$ .

b)  $KE = 440962 J$ .

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