Question:

A body weighs 63 N on the surface of the earth. What is the gravitational force on it due to the earth at a height equal to half the radius of the earth ?

Ans) Given: Weight of body on earth = 63N.

We know that,

acceleration due to gravity at height h from the earth's surface is given by

$$g' = \frac{g}{\left(1+\frac{h}{Re}\right)^2}$$

Given $h = \frac{Re}{2}$

$$g' = \frac{4g}{9}$$

Weight of body at height h is given by,

$$W' = mg'$$

$$= \frac{4}{9} mg$$

$$W' = \frac{4}{9} \times 63 = 28N$$

$$W' = 28N$$