A satellite which weighs 900 N on earth is orbiting the earth at a fixed distance of $3\ R_E$ from the earth's center. What is the force that it feels at that point?

a) 900 N   

b) 450 N   

c) 300 N   

d) 225 N   

e) 100 N   

f) None of the above
The correct answer is e) 100 N.

- If the object weighs 900 N on earth, the force of gravity which it feels there is $F_G = 900$ N, and its distance from the center of the earth is $D = 1*R_E$.

- At a distance $D' = 3*R_E$, the gravitational force is inversely proportional to the square of the distance, and so it is reduced to $1/3^2 = 1/9$ of its value at earth’s surface:

$$F'_G = \frac{900}{9} = 100 \text{ N}.$$