Answer on Question 69413, Physics, Other

Question:

A person of mass $60\ kg$ is standing in a lift. What is his weight when the lift is stationary and when it is moving with an acceleration $g/4$?

Solution:

a) When the lift is stationary, there is no acceleration and we can write the Newton's Second Law of Motion as follows:

$$\sum F_y = ma_y = 0,$$

$$N - mg = 0,$$

$$N = mg = 60\ kg \cdot 9.8\ \frac{m}{s^2} = 588\ N.$$

b) Let's consider the case when the lift moves with an upward acceleration $g/4$. Let's apply the Newton's Second Law of Motion:

$$\sum F_y = ma_y,$$

$$N - mg = ma,$$

$$N = mg + ma = m(g + a) = m\left(g + \frac{g}{4}\right) = m\frac{5}{4}g = 1.25mg =$$

$$= 1.25 \cdot 60\ kg \cdot 9.8\ \frac{m}{s^2} = 735\ N.$$

Answer:

a) $N = 588\ N$.

b) $N = 735\ N$.