Answer on Question #65729 - Physics – Mechanics

A pendulum bob of mass 50 g is suspended on a string from the ceiling of an elevator which is moving downwards with an acceleration 1.5 ms-2. Draw the free body diagram using the non-inertial frame of reference and determine the tension in the string. (Take g = 10 ms-2)

Solution.
1. Calculate total acceleration:
$$g_t = 10 - 1.5 = 8.5 \frac{m}{s^2};$$

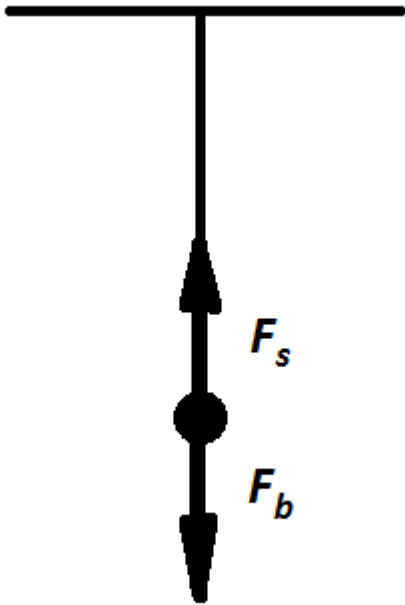2. Calculate applied to bob force:
$$F_b = mg_t;$$
$$F_b = 0.050 * 8.5 = 0.425N;$$

3. Calculate applied to string force:
$$F_s = -F_b;$$
$$F_s = -0.425N;$$

4. Draw the free body diagram: