A crate having a mass of 750kg is lifted from rest with a uniform acceleration by a crane such that after 10 seconds it has a velocity of 14m/s. Calculate the tension in the lifting cable. Please show and include all calculations and assumptions.

First of all we need to find acceleration of the crate:

$$a = \frac{v}{t}$$

Use second Newton's law:

$$T - F_g = Ma$$

$$T = F_g + Ma = Mg + Ma = M\left(g + \frac{v}{t}\right)$$

$$T = 750kg * \left(9.8m/s^2 + \frac{14m/s}{10s}\right) = 8400N$$

Answer: $T = 8400N$