A freight car of mass \( m_c \) contains a mass of sand \( m_s \). At \( t = 0 \) a constant horizontal force of magnitude \( F \) is applied in the direction of rolling and at the same time a port in the bottom is opened to let the sand flow out at the constant rate \( b = \frac{dm_s}{dt} \). Find the speed of the freight car when all the sand is gone. Assume that the freight car is at rest at \( t = 0 \).