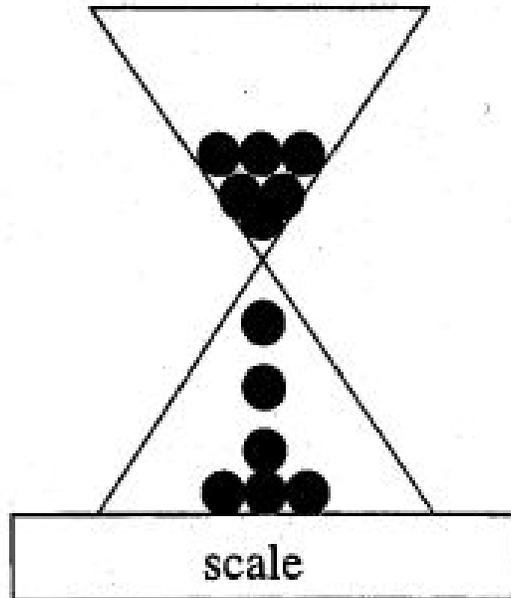


QP23



An hour glass of sand sits on a scale. Initially all the sand (of total mass m) in the glass (of mass M) is held in the upper reservoir. At $t = 0$, the sand is released and it falls at a constant rate $dm/dt = \lambda$ to the bottom of the lower reservoir, as shown. Find the reading of the scale as a function of time.

- (1 point) From the time $t = 0$ at which the sand is released, until the time $t = t_1$ at which it starts to arrive at the bottom of the reservoir.
- (1 point) From $t = t_1$ until the time $t = t_2$ at which all of the sand has left the upper reservoir.
- (1 point) From $t = t_2$ until the time $t = t_3$ at which all the sand has reached the bottom.
- (1 point) For all times $t > t_3$.
- (1 point) Sketch the reading of the scale as a function of time, assuming that $m < M$.