A particle P of mass 0.4 kg is projected horizontally along a smooth horizontal plane from a point O. At time t s after projection the velocity of P is $v\,\mathrm{m\,s^{-1}}$. A force of magnitude $0.8t$ N directed away from O acts on P and a force of magnitude $2\mathrm{e}^{-t}$ N opposes the motion of P.

(i) Show that $\dfrac{\mathrm{d}v}{\mathrm{d}t} = 2t - 5\mathrm{e}^{-t}$. [2]

(ii) Given that $v = 8$ when $t = 1$, express v in terms of t. [3]

(iii) Find the speed of projection of P. [2]