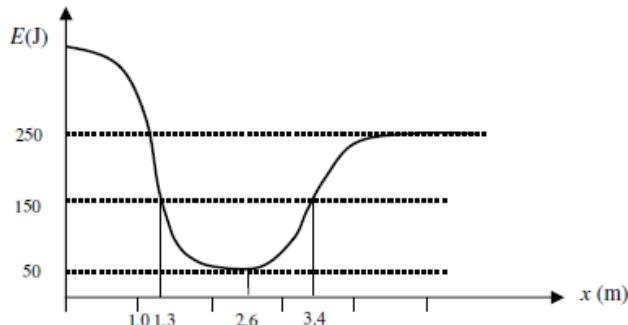


### Answer on Question #61697-Physics-Mechanics | Relativity

A particle of mass 2.5 kg moves in a conservative force field. Its potential energy curve is shown below. From the curve, determine (a) the total mechanical energy of the particle at  $x = 1.3$  m if it has a speed of 8  $\text{ms}^{-1}$  and (b) the minimum total energy at which the particle can escape from the force field. If  $E_{\text{tot}} = 150$  J, where would the particle have (i) zero velocity, (ii) maximum velocity



#### Solution

(a)

$$E_{\text{tot}}(1.3) = E(1.3) + \frac{mv^2}{2} = 150 + \frac{1}{2} \cdot 2.5 \cdot (8)^2 = 230 \text{ J.}$$

(b) The minimum total energy at which the particle can escape from the force field is

$$E_{\text{tot}} = E(\infty) + \frac{m0^2}{2} = 250 \text{ J.}$$

(i)

$$E = 150 \text{ J} \rightarrow x = 1.3 \text{ m or } 3.4 \text{ m.}$$

(ii) Maximal velocity would be at the minimum of potential energy.

$$X = 2.6 \text{ m.}$$