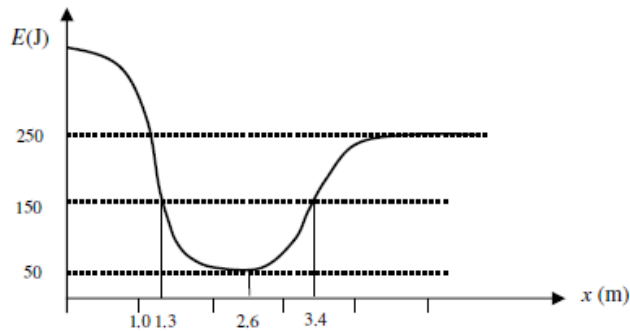


Answer on Question #61697-Physics-Mechanics | Relativity

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 ms^{-1} and (b) the minimum total energy at which the particle can escape from the force field. If $E_{\text{tot}} = 150 \text{ J}$, where would the particle have (i) zero velocity, (ii) maximum velocity



Solution

(a)

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

(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.

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