

- 2 (a) A 300 kg cart at a fun fair rolls from A to B along a track, with an initial speed of 5.0 m s^{-1} . At B, its potential energy is 35 kJ less than at A, as shown in Fig. 2.1.



Fig. 2.1

Between A and B, the work the cart does against resistive forces is 15 kJ.

Determine the speed of the cart at B.

$$\text{speed at B} = \dots \text{ m s}^{-1} \quad [3]$$

- (b) A force F is applied on a mass m on a surface over a displacement of s . The mass has an initial velocity of u and a final velocity of v , as shown in Fig. 2.2.

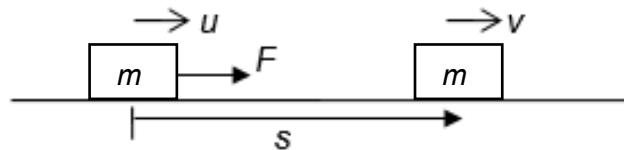


Fig. 2.2

Starting with the definition of work done and using the equations of motion, show that the kinetic energy of m after displacement s is $\frac{1}{2} mv^2$.

State an assumption necessary for the derivation.

Assumption:

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..... [4]