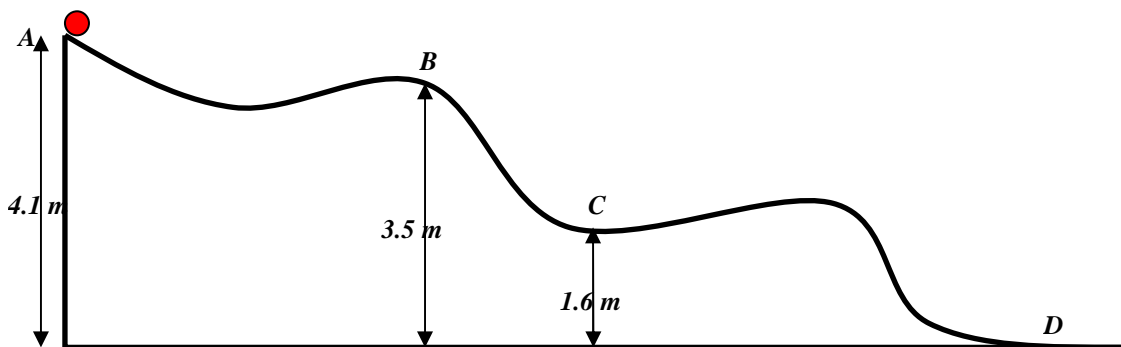


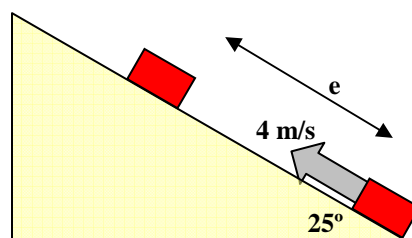
## Conservation of mechanical energy

**14** A particle of mass  $m = 5 \text{ kg}$  is released from point A and slides on the frictionless track shown in figure. Determine: a) The *particle's speed* at points B, C and D. b) The *net work* done by the *gravitational force* in moving the particle from A to C. c) How *high* is the particle when its speed is  $4 \text{ m/s}$ ? **A:** a)  $3.42 \text{ m/s}$ ,  $7 \text{ m/s}$ ,  $8.96 \text{ m/s}$ . b)  $122.5 \text{ J}$ . c)  $2.8 \text{ m/s}$ .



**20.** Starting from rest, a  $4.00 \text{ kg}$  block slides  $3.50 \text{ m}$  down a rough  $30.0^\circ$  incline. The coefficient of kinetic friction between the block and the incline is  $\mu = 0.400$ . Determine the *work* done by: a) The *force of gravity*. b) The *friction force* between block and incline. c) The *normal force*. d) Determine the *speed* of the block after sliding  $3.50 \text{ m}$ . **A:** a)  $W_g = 68.6 \text{ J}$ . b)  $W_f = -27.4 \text{ J}$ . c) ..... d)  $4.5 \text{ m/s}$ .

**21.** A  $2 \text{ kg}$  block is shot up the incline in figure with an initial speed of  $4 \text{ m/s}$ . How far up the incline will it go if the coefficient of friction between it and the incline is  $0.1$ ? **A:**  $1.6 \text{ m}$ .



**22.** A teacher wants to determine the coefficient of friction between a block and a particular surface. She places a block of mass  $3 \text{ kg}$  on an inclined plane. The plane makes an angle of  $30^\circ$  with respect to the horizontal. The block starts from rest a distance of  $12 \text{ m}$  up the incline. She lets the block go, and it slides down the plane and along a table top. The block comes to rest  $8 \text{ m}$  from the start of the incline. The coefficient of kinetic friction is the same on the incline and the tabletop. What is the *coefficient of friction*? **A:**  $\mu = 0.33$ .