Kaleb Burris
PHYS 211X
HW 8, Due Friday, 3/24/2023 23:59; §10 Q: P: #24, 41, 45, 47 §11 Q: #5, 9, 13 P: #27, 28, 40, 47

Chapter 10

Problems

24. a. The particle will move to the right.

b.

$$\begin{aligned} KE &= 3.0J \text{ at } x = 4m \\ \vec{v} &= \sqrt{2m(KE)} \\ \vec{v} &= \sqrt{2(0.020)(3.0)} \\ &= \boxed{0.35m/s \text{ at } x = 4m} \end{aligned}$$

c. There are turning points at $x = 1m$ and $x = 4m$.

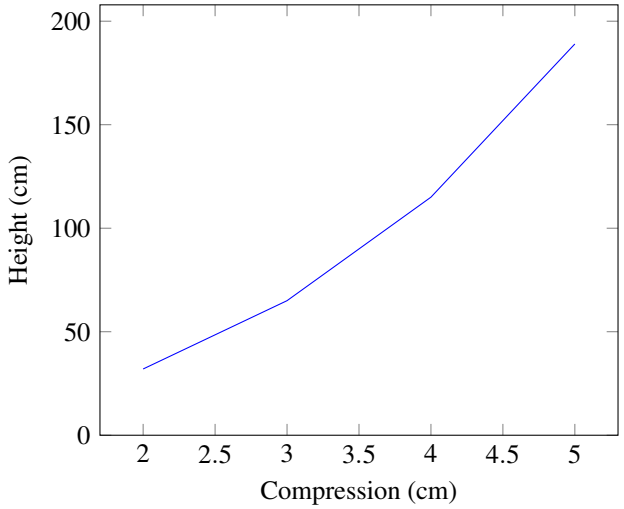
41.

$$\begin{aligned} KE_i + U_i &= KE_f + U_f \\ KE &= \frac{1}{2}mv^2 \\ U &= mgy \\ \frac{1}{2}mv_i^2 + mgy_i &= \frac{1}{2}mv_f^2 + mgy_f \\ v_i &= \sqrt{v_f^2 + 2gy_f - 2gy_i} \\ &= \sqrt{3^2 + 2(-9.8)(0.20) - 2(-9.8)(0)} \\ &= \sqrt{9 - 3.92} = \sqrt{5.08} = \boxed{2.25m/s} \end{aligned}$$

45.

$$\begin{aligned} K_i &= 0 \\ U_i &= mgh \\ K_f &= 1/2mgr \\ U_f &= 2mgr \\ 0 + mgh &= 1/2mgr + 2mgr \\ mgh &= 5/2mgr \\ h &= \boxed{\frac{5}{2}r} \end{aligned}$$

47.



$$\begin{aligned} K_i + U_i &= K_f + U_f \\ 0 + 1/2kx^2 &= 0 + mgh \\ m &= \frac{1/2kx^2}{gh} \\ &= \frac{1/2(950)x^2}{-9.8h} \end{aligned}$$

Chapter 11

Questions

5.

9.

13.

Problems

27.

28.

40.

47.