Physics 2311. Mechanics of Solids

Ch. 7 Exam-like questions　　　　　　　Name:_____

Use to practice for exam.

1. The most general expression for the work done by a *constant* force, $\vec{F}$ over a displacement $\Delta\vec{x}$ is

   (a) $W = \vec{F}\Delta\vec{x}$　　(b) $W = Fdx$　　(c) $W = \vec{F}\cdot\Delta\vec{x}$　　(d) $W = F\Delta x\sin\theta$
   (e) $W = F\Delta x$

2. A 0.5 kg object moves in a horizontal circular track with a radius of 5.0 m. An external force of 2.0 N, always tangent to the track, causes the object to speed up as it goes around. The work done by the external force as the mass makes one revolution is:

   (a) 63 J　　(b) 94 J　　(c) 118 J　　(d) 188 J　　(e) 25 J

3. A 2 kg spring bob is held in the hand and moved horizontally at *constant speed* from equilibrium position to 0.2 m. The spring constant is 300 N/m, and the system is just the bob. (Assume no friction.)

   (P1) What is the change in kinetic energy of the bob?
   　　(a) -12 J　　(b) -6 J　　(c) 0 J　　(d) 6 J　　(e) 12 J
   (P2) What is the work done by the spring on the bob?
   　　(a) -12 J　　(b) -6 J　　(c) 0 J　　(d) 6 J　　(e) 12 J
   (P3) What is the net work done on the bob? (Use work-KE theorem.)
   　　(a) -12 J　　(b) -6 J　　(c) 0 J　　(d) 6 J　　(e) 12 J
   (P4) What is the work done by the hand on the bob?
   　　(a) -12 J　　(b) -6 J　　(c) 0 J　　(d) 6 J　　(e) 12 J

4. For the above spring with $k = 300$ N/m, if the 2 kg bob is released from rest at x=0.2 m, what is the speed of the bob as it crosses the equilibrium position at x=0.0?

   (a) 0　　(b) 1.2 m/s　　(c) 2.4 m/s　　(d) 2.9 m/s　　(e) 3.5 m/s

5. What is the work done by gravity on a 0.3 kg ball when it is thrown from a height of 1 m to a height of 7 m?

   (a) 21 J　　(b) -12 J　　(c) -18 J　　(d) 12 J　　(e) 18 J

6. What work would be done by gravity if the 0.3 kg ball moved 4 meters horizontally and 4 meters down?

   (a) 21 J　　(b) -12 J　　(c) -18 J　　(d) 12 J　　(e) 18 J

7. **What is the work done by the force** $F(x) = (8x - 3x^2)\hat{i}$ **moving an object from** $x_i = 0$ **to** $x_f = 3$**?**

   (a) 9 J   (b) 27 J   (c) 0 J   (d) -9 J   (e) -27 J