**Practice 6.0 - Work and Energy**

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|  | Work: **W = Fs** |
| 144 J | 1. How much work does Fred do exerting 45.0 N to lift a box 3.20 m? |
| 60.0 J | 2. How much work does Adair lifting a 12.0 N box up 5.00 m? |
| 138 m | 3. An alkaline AA battery contains 9360 J of energy. If it takes 68.0 N of force to drag a heavy box across the floor, how far could the energy in a AA battery drag the box? |
| 1.56 m | 4. What vertical distance will 64.0 J of work lift a box that weighs 41.0 N |
| 0.694 N | 5. Katherine moves a box 7.20 m doing 5.00 J of work. What is the frictional force? |
| 28.5 N | 6. What force exerted for 4.10 m does 117 J of work? |
|  | Potential Energy: **PE = mgh** |
| 636 J | 7. What is the potential energy of a 5.40 Kg shot put that is 12.0 m in the air? |
| 21.3 J | 8. What is the potential energy of a 3.20 kg clock weight that has been wound up to a height of 0.680 m? |
| 162 Kg | 9. What is the mass of a pile driver if it has 13,200 J of PE when it is 8.30 m in the air? |
| 68.0 kg | 10. What mass has a PE of 140. J when it is at an elevation of 0.210 m? |
| 13.3 m  (43.5 feet) | 11. An alkaline AA battery contains 9360 J of energy. If I connected it to a 100% efficient winch, how high could it lift a 72.0 kg person? |
| 19.0 m | 12. To what height must a 0.145 Kg baseball rise to get a potential energy of 27.0 J? |
|  | Kinetic energy: **KE = 1/­2mv2** |
| 116 J | 13.What is the kinetic energy of a 0.145 Kg baseball going 40.0 m/s? (about 90 mph) |
| 2634 J | 14. What is the kinetic energy of a 4.20 g (0.0042 kg) bullet going 1120 m/s? |
| 359 m/s  (mach 1.05) | 15.An alkaline AA battery contains 9360 J of energy. If I connected it to a 100% efficient pitching machine, how fast could it pitch a 0.145 kg baseball? |
| 15.9 m/s | 16. What speed must a 0.450 Kg hammer have to have a kinetic energy of 57.0. J? |
| 172 kg | 17. A pile driver must develop 14,500 J of kinetic energy when it is going 13.0 m/s. What does its mass have to be? |
| 0.00689 Kg  (6.89 g) | 18. A bullet with a speed of 892 m/s has a kinetic energy of 2740 J. What is its mass? |
|  | Springs: **F = kx** |
| 4.06 N | 19. What force do you need to stretch a 31.2 N/m spring 13.0 cm? |
| 42.8 N/m | 20. You hang a 200. gram mass on a spring, and it stretches 4.58 cm. What is its spring constant in N/m? (F = mg, 1000 g = 1 kg, 100 cm = 1 m) |
| 31.9 cm | 21. If you exert 15.0 N on a spring with a constant of 47.0 N/m how many centimeters will it stretch? |
|  | Springs: **PE = 1/­2kx2** |
| 83.3 J | 22. What is the energy stored in a bow with a constant of 371 N/m if you stretch it 67.0 cm? |
| 944 N/m | 23. A spring has a potential energy of 6.80 J when it is stretched 12.0 cm. What must be the spring constant? |
| 0.620 m or  62.0 cm | 24. What distance must you compress a 78.0 N/m spring to store 15.0 J of energy? |