



WebAssign
CH07-HW03-SP12 (Homework)Yinglai Wang
PHYS 172-SPRING 2012, Spring 2012
Instructor: Virendra Saxena**Current Score** : 18 / 18 **Due** : Tuesday, February 28 2012 11:59 PM EST**1.** 6/6 points | [Previous Answers](#)

MI3 7.5.P.046


150 grams of boiling water (temperature 100° C, heat capacity 4.2 J/gram/K) are poured into an aluminum pan whose mass is 1050 grams and initial temperature 22° C (the heat capacity of aluminum is 0.9 J/gram/K).

(a) After a short time, what is the temperature of the water?

$T_{\text{final}} =$  ° C (b) What simplifying assumptions did you have to make?

- ☒ Energy transfer between the system (water plus pan) and the surroundings was negligible during this time.
 - ☒ The heat capacities for both water and aluminum hardly change with temperature in this temperature range.
 - ☐ The thermal energy of the aluminum doesn't change.
 - ☐ The thermal energy of the water doesn't change.
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(c) Next you place the pan on a hot electric stove. While the stove is heating the pan, you use a beater to stir the water, doing 31646 J of work, and the temperature of the water and pan increases to 81.5° C. How much energy transfer due to a temperature difference was there from the stove into the system consisting of the water plus the pan?


$Q =$  J

- [Read the eBook](#)
- [Section 7.5](#)

2. 1/1 points | [Previous Answers](#)

MI3 7.7.X.041

A certain motor is capable of doing 5500 joules of work in 7 seconds. What is the power output of this motor?

Power =  watts

- [Read the eBook](#)
- [Section 7.7](#)

3. 2/2 points | [Previous Answers](#)

MI3 7.7.P.047

(a) If you follow a diet of 1920 food calories per day (1920 kilocalories), what is your average power

consumption in watts? (A food or "large" calorie is a unit of energy equal to 4.2×10^3 J; a regular or "small" calorie is equal to 4.2 J.) Note for comparison that the power consumption in a table lamp is typically about 100 watts.

 watts

(b) How many days of a diet of 1920 large calories are equivalent to the gravitational energy change from sea level to the top of Mount Everest, 8848 m above sea level? Assume your weight is 61 kg. (The body is not anywhere near 100% efficient in converting chemical energy into change in altitude. Also note that this is in addition to your basal metabolism.)

 days

- [Read the eBook](#)
- [Section 7.7](#)

4. 4/4 points | [Previous Answers](#)

MI3 7.7.P.050

During 2 hours one winter afternoon, when the outside temperature was 12°C , a house heated by electricity was kept at 23°C with the expenditure of 60 kwh (kilowatt-hours) of electric energy.

(a) What was the average energy leakage in joules per second (watts) through the walls of the house to the environment (the outside air and ground)?

 watts

(b) The rate at which energy is transferred between two systems due to a temperature difference is often proportional to their temperature difference. Assuming this to hold in this case, if the house temperature had been kept at 27°C (80.6°F), how many kwh of electricity would have been consumed?

 kwh

- [Read the eBook](#)
- [Section 7.7](#)


5. 5/5 points | [Previous Answers](#)

MI3 7.1.P.029

Energy in a spring-mass system

A horizontal spring-mass system has low friction, spring stiffness 230 N/m, and mass 0.5 kg. The system is released with an initial compression of the spring of 13 cm and an initial speed of the mass of 3 m/s.

(a) What is the maximum stretch during the motion?

 m

(b) What is the maximum speed during the motion?

 m/s

(c) Now suppose that there is energy dissipation of 0.03 J per cycle of the spring-mass system. What is the average power input in watts required to maintain a steady

oscillation?

 watt

- *Read the eBook*
- [Section 7.1](#)