

**Review Sheet for PHY 101 Final Exam**  
**7:15 p.m., December 12, 2001, in Stolkin Auditorium**

$$KE = \frac{1}{2}mv^2.$$

$$GPE = mgh.$$

$$Elast.PE = \frac{1}{2}kx^2.$$

$$W = F * \Delta x.$$

$$P = \frac{\Delta E}{\Delta t}.$$

$$F_{grav} = mg.$$

$$F_{spring} = kx.$$

$$P_{elect} = V * I.$$

$$V = I * R.$$

$$Elect.PE = \frac{1}{2}CV^2.$$

Electrochemical Energy stored in battery = Voltage \* Capacity

$$W + H = \Delta E.$$

$$H = C * m * \Delta T$$

$$E = m * c^2.$$

$$p * V = n * R * T$$

$$p * V = N * k_B * T$$

$$Thermal Energy = (3/2) * N * k_B * T$$

$$W = p * \Delta V$$

Memorize these numbers

Solar Flux =  $1.4 \text{ kW/m}^2$ .

1 kcal = 4184 J

Energy content of organic fuel or food (fat) =  $30 * 10^6 \text{ J/kg}$ .

Human Basal Metabolic Rate =  $1.0 \text{ kcal / kg hr}$

Energy expenditure in light activity =  $1 \text{ kcal / kg hr}$

Energy expenditure in exercise =  $10 \text{ kcal / kg hr}$

U.S. energy consumption =  $1 * 10^{20} \text{ J / year}$

85% supplied by fossil fuels

39% from petroleum

24% from imported petroleum

World's supply of petroleum = a few decades of consumption at present rate

World's supply of coal = a millenium of consumption at present rate

Cost to generate electricity in fossil fuel plant =  $\$0.03/\text{kWh}$

Cost to generate electricity via solar cells =  $\$0.10/\text{kWh}$  or greater

## Study Guide

Key Homework Problems to Study:

HW#1, Question 9  
HW#2, Question 7  
HW#4, Question 1  
HW#5, Question 3  
HW#5, Question 5  
HW#6, Question 3  
HW#6, Question 4  
HW#6, Question 5  
HW#7, Question 1  
HW#7, Question 2  
HW#7, Question 4  
HW#7, Question 5  
HW#8, Question 3  
HW#9, Question 1  
HW#9, Question 2

Plus: Know the meaning and use of each formula on page 1 of this review sheet.  
(Page 1 will be provided to you during the exam.)

Plus: Memorize the numbers on page 2 of this review sheet, and be able to answer questions that use those numbers. (Page 2 will NOT be provided to you during the exam.)