

PHYSICS-2

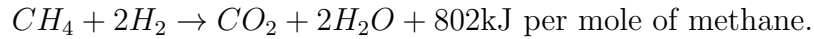
Elementary Physics of Energy

Homework 3

Due Date: APRIL 27, 2011

Problems on thermodynamics

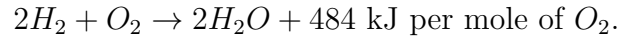
1. Consider the chemical reaction of burning methane:



Calculate the amount of CO_2 released per day into the atmosphere in a plant that generates 1000 Btu of power per day. Also find the amount of methane needed per day. [15]

{ Hint: This and next problem are similar to the problem done in class. }

2. Consider a reaction



Using 1 tonne of H_2 as a fuel, how much energy does this produce? Also how much oxygen does it consume? [15]

3. 15 kg of water at 20°C and 20 kg of Copper at 60°C are mixed, what is the final temperature? The specific heat of copper is $0.358 \frac{J}{g \cdot ^\circ\text{C}}$. [15]
4. In the above problem we forget to measure the quantity of water, but find that the final temperature is 25°C . How much water did we start with? [15]
5. Calculate the heat required in BTu to raise 1 tonne of water from 40°F to 120°C . The latent heat of boiling for water is 2.25 MJ/kg . [20]
{ Hint: As in class, do this in two stages. }
6. How much heat is liberated when 1 tonne of water goes from 5°C to ice at -15°C ? The latent heat for melting of ice is 333 kJ/kg . [20]