

Homework 3 - (120 points)

An old coal-fired power plant runs with a heat rate of 9000 Btu/kWh. The heating value of the coal is known to be 22,000 kJ/kg. The coal content includes 65% carbon, 2% sulfur, and 5% unburnable minerals (i.e., ash).

- Q1. What is the fuel rate of the coal [kg/kWh] ?
- Q2. What is the carbon emission rate [kg C/kWh]?
- Q3. What is the CO<sub>2</sub> emission rate [kg CO<sub>2</sub> /kWh] ?
- Q4. What is the sulfur emission rate [kg S/kWh]?
- Q5. If 70% of the ash is released as particular matter from the stack (called "fly ash"), what is the uncontrolled particulate emission rate [kg ash/kWh]?
- Q6. What is the efficiency of the power plant ?