

The Saylor Foundation's
ME103 Assessment, Unit 5

Instructions: Please answer each of the following questions to the best of your ability.

Questions:

1. Determine the minimum of energy supplied by a heat pump to maintain a house at 22°C , when the outside temperature is 10°C . The house is losing heat to outside at the rate of 50,000 kJ per hour.
2. What is the maximum efficiency of a heat engine operating between a heat source at 500 K and a heat sink at 300 K?
3. Calculate the change in entropy when 10 kmol of an ideal gas at 335 K and 10 bar is expanded irreversibly to 300 K and 1 bar? Take C_p to be 50 kJ/kmol K.
4. Use the Mollier diagram to determine the specific enthalpy and specific entropy of wet steam of quality 0.85 at 2 bar pressure.

