編號: 145

國立成功大學九十七學年度碩士班招生考試試題

共一頁,第一頁

系所: 工程科學系丁、己組

科目:熱力學

本試題是否可以使用計算機: 回可使用 , 口不可使用 (請命題老師勾選)

考試日期:0301,節次:1

- 1. Draw qualitatively a temperature-volume diagram for water for two constant pressures 10 MPa and 1 MPa, respectively, showing compressed liquid states, saturated-liquid lines, vaporization processes, saturated-vapor lines, and superheated-vapor states.(15%) What is the concept of a triple point of a pure substance?(4%)
- 2. Express the first law of thermodynamics for a change in states of a system. (6%) Give explanations for the meanings of the "energy" and "internal energy" of a system. (5%) Give comparisons between heat and work. (6%)
- 3. Derive $C_r C_r = R$ for an ideal gas. C_r and C_r are constant-pressure and constant-volume specific heats, respectively. (6%)
- 4. Derive the "Inequality of Clausius".(16%) Then, explain why "entropy" is a property of a system?(6%)
- 5. Derive an entropy change relation of an ideal gas (8%), and derive the pressure-volume relation for a reversible adiabatic process of an ideal gas with constant specific heats (8%)
- 6. Air (R=1715 $ft^2/(s^2 \cdot {}^\circ R)$, $c_r = 6003 ft \cdot lbf/(slug \cdot {}^\circ R)$ flows steadily, as shown below, through a turbine which produces 700 hp. For the inlet and exit conditions shown below, estimate
 - (a) the exit velocity V_1 and (b) the heat transferred \dot{Q} in Btu/h.(20%)

