●不可使用電子計算機

2018 熱力考題(轉學考)

1. Starting with the first Tds relation $ds = \dfrac{du}{T} + \dfrac{P\,dv}{T}$, prove (證明) that isentropic process (s = constant) will also lead to(導致) isothermal process (T= constant) for incompressible substances (ex. solid or liquid, $c_v = c_p = c$, $du = c\,dT$) (15%)

2. (a) Please define coefficient of performance of refrigerator (COP_R) and heat pump (COP_{HP}) (10%)

   (b) Prove that $COP_{HP} = COP_R + 1$ (10%)

3. Use the Fig. 1 to prove that the **reversed Carnot cycle produces a greater** amount of **refrigeration**, with **less work input** (高製冷能力，低耗功) compared to that of gas refrigeration cycle. (15%)
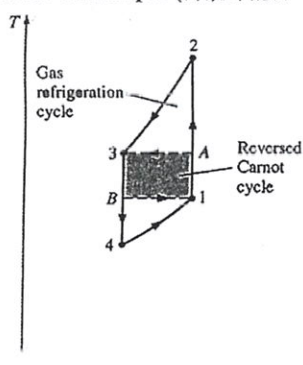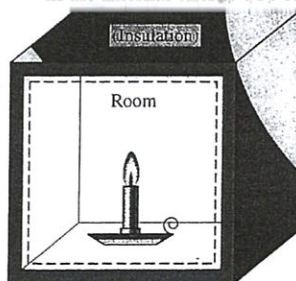

Fig.1

4. A candle is burning in a well-insulated room. Taking the room (the air + the candle) as the system, determine (a) if there is any heat transfer during this burning process and (b) if there is any change in the internal energy (U) of the system. (10%)

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5. What is the definition of performance (or efficiency) (5%)

6. What's the difference between saturated vapor (飽和氣) and superheated vapor(過熱氣)? (5%)

7. Why is the combined gas–vapor cycle more efficient than either of the cycles (a gas power cycle or a vapor power cycle) operated alone? *(5%)*

8. What's 2nd law of thermodynamics – Clausius Statement ? (5%)

9. What's the "difference" between air-standard assumption and "cold" air-standard assumption? (5%)

10. What's the function of heat engine ? (5%)

11. What final state (最終狀態) will maximize (最大化) the work output of a device? (5%)

12. Is it possible to create(產生) entropy? Is it possible to destroy (毀滅) it? (5%)