

元智大學 109 學年度 碩士班 招生試題卷

系(所)別：機械工程學系碩士班 組別：不分組

科目：熱力學

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●不可使用電子計算機

1. What's the difference between lower heating value (LHV, 低熱值) and higher heating value (HHV, 高熱值)? (10%)
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%)

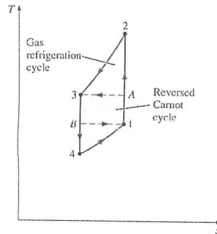
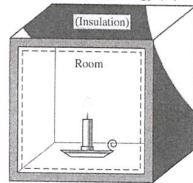


Fig.1

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. (15%)



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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 – Kelvin-Planck 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%)

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