所別： 機械工程學系 碩士班 熱流組(一般生)　　　　　共 1 頁　第 1 頁

科目： 熱力學

本科考試可使用計算器，廠牌、功能不拘　　　　　＊請在答案卷(卡)內作答

所有題目皆為問答題，需寫完整計算過程。請按題號順序作答，避免被漏改。若您要先做後面題目，請先在答案本預留空間。

1. (6 %) Why are the temperature and pressure dependent properties in the saturated mixture region?

2. (6 %) The difference between the total energy for a flowing fluid system and a stationary (not flowing) system.

3. (6 %) Explain what is throttling valve and its major application in thermodynamic process.

4. (6 %) What is the second-law efficiency? How does it differ from the first-law efficiency?

5. (6 %) Consider a thermal energy reservoir at 1227°C that can supply heat at a rate of 150,000 kJ/h to an engine. Determine the maximum output power (in kW unit) of the engine, assuming an ambient temperature of 25°C. Will higher temperature of heat source increase the maximum power?

6. (8 %) What is heat engine? Please explain its purpose, efficiency and give a sketch to show its operating character.

7. (6 %) Under what conditions is the ideal-gas assumption suitable for real gases?

8. (6 %) Write and explain the expression of energy balance, entropy balance and exergy balance for a closed system.

9. Sketch *schematic diagrams* **and** accompanying *T-s diagrams* of

    (8 %) (a) a simple ideal steam Rankine cycle,

    (12 %) (b) an ideal steam regenerative Rankine cycle with one open feedwater heater.

10. (15 %) Sketch *schematic diagrams* **and** accompanying *T-s diagrams* of a two-stage cascade refrigeration. What are the advantages of a cascade system over a single stage system?

11. (15 %) 請說明 2 種處理真實氣體混合物之方法