國立臺北科技大學104學年度碩士班招生考試

系所組別：1303 車輛工程系碩士班

第三節熱力學試題（選考）

注意事項：

1. 本試題共五題，配分共100分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、(20%)A fan that consumes 20 W of electric power when it operates to discharge air from a ventilated room. Determine the discharge velocity of air,if the atmospheric pressure is 101.3kPa, air temperature 25^0C, and the area of the fan 0.1341 m^2. (air R=0.287 kJ/kgK)

二、(20%)The air in an automobile tire with a volume of 0.016 m^3 is at 28^0C and 130 kPa(gage).Determine the amount of air that is added to raise the pressure to 225 kPa(gage).(The atmospheric pressure is 101.3 kPa, and the temperature and volume remain constant.)

三、(20%)A heat pump is used to heat a house during the winter. The house is to be maintained at 25^0C at all times. The house is estimated to be losing heat at a rate of 100000 kJ/h when the outside temperature drops to 1^0C. Determine the minimum power required to drive this heat pump.

四、(20%)A 25 kg block of iron casting at 250^0C is thrown into a large lake that is at a temperature of 15^0C. The iron block eventually reaches thermal equilibrium with the lake water. Determine(a)(7%)the entropy change of the iron block(b)(6%)the entropy change of the lake water(c)(7%)the entropy generated during this process.(An average specific heat of 0.45 kJ/kgK for the iron)

五、(20%)A piston-cylinder device contains 1kg of an ideal gas. The gas is cooled at constant pressure until its temperature decreases by 10^0C. If 20.75 kJ of compression work is done during this process, determine (a)(6%) the gas constant (b)(7%)the constant volume specific heat (c)(7%) the constant pressure specific heat if its specific heat ratio is 1.667.