KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food.Engg) 2012 Admission
IInd Semester Final Examination- July -2013

Cat. No: Meen.1203

Title: Engineering Thermodynamics (2+1)

Marks: 80

Time: 3 hours

I. Fill up the blanks / state True or False/ define [10x1=10]

1. The sum of ---------------------- and -------------------- is enthalpy.
2. Universal gas constant is ---------------------.
3. The ratio of specific heats of gas at constant pressure to constant volume is ---------------.
4. ---------------law states that the internal energy of a gas is a function of temperature.
5. Carnot cycle has maximum efficiency.
6. Barometric pressure is equal to 760mm of mercury.
7. Heat and work are path function.
8. Define internal energy.
9. Define second law of Thermodynamics.
10. Define dryness fraction.

II. Write short notes/answer on ANY TEN. [10x3=30]

1. State the zeroth law of thermodynamics and explain it.
2. A gas occupies 0.35cubic meter at a pressure of 1kg/sqcm. Find the work done on the gas, if it is compressed isothermally to a pressure of16kg/ sqcm.
3. What is a reversible thermodynamic process?
4. Explain the concept of entropy. Deduce the expression for the entropy for a monatomic gas.
5. Write short notes on closed system and open system.
6. Differentiate work and heat.
7. Differentiate isothermal and isentropic process.
8. Distinguish between a perfect gas and real gas.
9. Show that the change in entropy of a substance in a cyclic process is zero.
10. Write the methods for producing compressed air.
11. Explain what do you mean by degree of freedom.
12. What do you mean by staging of compressor.

III. Answer ANY SIX   [6x5=30]

1. Write the importance of steam table and represent the various properties.

2. Hundred liters of air at 1.0kg/sqcm absolute and 30°C is heated at constant pressure until its temperature is 100°C and then it is compressed to to 40 liters according to the law $Pv^{1.2}$ = constant. Find the change in entropy of each stage and of the system. R=29.3 and Cp =0.24.

3. Explain the working of an inter stage air cooler in multistage compressor.

4. 1.0 kg of steam initially dry saturated at 11.0kg/ sq. cm expands in a cylinder following the law $pv^{1.13}$ = constant. The pressure at the end of the expansion is 1.0kg/ sq cm. Determine a) final volume b) final dryness fraction c)work done   d)the change in internal energy.

5. Explain the working of an Otto cycle and deduce the formula for its efficiency.

6. Derive the expression for work done during the adiabatic process.

7. What is a compressor and explain different types of it.

8. Deduce from the kinetic theory of gases, an expression for the pressure of a gas. Also prove that PV = RT

iv. Answer ANY ONE only.   [1x10=10]

1. Derive the expression for the efficiency of Diesel engine.

2. . Calculate the work done in a Carnot cycle. Deduce the efficiency of carnot engine in terms of temperatures between it works.