KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food . Engg) Degree Programme 2015 Admission

II[nd] Semester Final Examination- June – July 2016

Cat. No: Meen 1203 **Marks: 50.00**

Title: Engineering Thermodynamics (2+1) **Time: 2 hours**

I State true or false **(10 x 1 =10)**

1. In isothermal process change in internal energy is zero.
2. In a reversible cycle, the entropy of the system decreases.

Fill up the blanks

3. Isentropic flow is _____ adiabatic flow.
4. The art of measuring the moisture content of air is called as _____.
5. The difference between dry bulb and wet bulb temperatures is called _____
6. The ratio of mass of dry steam to the sum of the mass of dry steam and water vapour is called _____
7. In SI units, the value of universal gas constant is _____J/mole /K.
8. The heating and expanding of a gas is called _____ cycle.
9. Freezing temperature of water _____ with increasing pressure.
10. An _____ line is also a constant pressure line during wet region.

II Write short notes ANY FIVE **(5 x 2 =10)**

1. Differentiate latent heat and sensible heat of steam.
2. Find the dryness fraction, specific volume and internal energy of steam at 7 bar and enthalpy 2600 KJ/kg.
3. Explain the first law f thermodynamics as referred to the closed systems undergoing a cyclic change.
4. Write down the Clasius statement of second law of thermodynamics.
5. What is the difference between ideal and actual cycle?
6. Write short notes on temperature-entropy diagram.
7. Write short notes on Vander Waal's equation.

III. Explain ANY FIVE of the following **(5 x 4 =20)**

1. A Carnot engine working between 377°C and 37°C produces 120 kj of work. Determine the head added in kj, the engine thermal efficiency and the entropy change during heat rejection process.
2. Discuss in detail about Stirling cycle.
3. Discuss at length about the steam tables and its uses.
4. Write short notes on reciprocating air compressors.
5. Discuss about the relation between C_p and C_v
6. The properties of a closed system change following the relation between pressure and volume as $pV=3$ where p is in bar and V is in m^3. Calculate the work done when the pressure increases from 1.5 bar to 7.5 bar.
7. Write short notes on Ericson cycle.

IV. Write essay on ANY ONE **(1 x 10=10)**

1. Discuss in detail about the various stages of Carnot cycle with suitable sketch.
2. An engine of 250 mm bore and 375 mm stroke works on Otto cycle. The clearance volume is 0.00263 m^3. The initial pressure and temperature are 1 bar and 50 C. If the maximum pressure is limited to 25 bar, find the following : (a) the air standard efficiency of the cycle and (b) the mean pressure for the cycle. Assume ideal conditions.