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Roll No

AU/ME-3005 (CBGS)**B.E., III Semester**

Examination, December 2017

Choice Based Grading System (CBGS)**Thermodynamics***Time : Three Hours**Maximum Marks : 70*

- Note:** i) Attempt any five questions.
 ii) All questions carry equal marks.
 iii) Steam tables & Mollier charts are permitted.

1. Explain following:
 - a) Steady flow process
 - b) Limitations of first law of thermodynamics
 - c) Reversible and irreversible process
2. a) What is a heat pump? How does it differ from a refrigeration?
 b) An inventor claims to have developed an engine that takes in 105mJ at a temperature of 400k and rejects 42mJ at a temperature of 200k and delivers 15kwh of mechanical work. Would you advise money to put this engine in the market.
3. a) Explain formation of steam with the help T-H (Temperature-Heat) diagram.

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- b) The following observations were recorded to find the dryness fraction of steam by combined separating and throttling calorimeter. Total quantity of steam passed = 36kg, water drain from separator = 2kg, steam pressure before throttling = 12bar, Temp. at steam after throttling = 110°C, pressure of steam after throttling = 1.013 bar specific heat of steam = 2.1kJ/kg.K, Determine the dryness fraction of steam before inlet to the calorimeter.
4. a) What is the main features of triple points?
 b) Draw the phase equilibrium diagram for a pure substance on H-S plot with relevant constant property lines.
5. a) What are limitations of Carnot cycle?
 b) For a given compression ratio, the air standard Diesel cycle is less efficient than air standard Otto cycle explain.
6. In air-standard Diesel cycle with compression ratio 17, the condition of air at the start of compression stroke are 1 bar and 300k. After addition of heat at constant pressure the temperature rises to 2700 °K Determine thermal efficiency of cycle and mean effective pressure.
7. a) Explain actual and theoretical combustion process.
 b) Write basic concept of third law of thermodynamics.
8. a) Write properties of Ideal gases.
 b) Define Enthalpy of reaction
 c) Explain PVT surfaces

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