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Roll No .....

AU/ME-3005-CBGS

B.E. III Semester

Examination, June 2020

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) Draw neat sketch if required.

1. a) State the Zeroth law of thermodynamics. Discuss its importance in brief. 7
   b) An inventer claims to have developed an engine that takes 105 MJ at a temperature of 400K, rejects 42MJ at a temperature of 200K and delivers 15 kWh of mechanical work. Is this engine feasible? 7

2. a) What is first of law of thermodynamics? Explain. 7
   b) A mixture of gases expands from $0.03m^2$ to $0.06m^3$ at constant pressure of 1MPa and absorb 84kj heat during the process. Find the change in internal energy of the mixture. 7

3. a) A heat engine is supplied with 278kW of heat at a constant fixed temperature of 283°C and the heat rejection takes place at 5°C, the engine is reversible, find heat rejected in kW. 7

b) A heat engine receives 1120KJ of heat and rejects 840KJ of heat while operating between two temperature limits of 560K and 280K. It indicates which type of cycle on which engine operates. 7

4. a) What do you mean by Entropy? Explain. 7

b) Discuss the various uses of steam table. 7

5. a) Write a short note on Enthalpy and specific heat of gas mixtures. 7

b) A heat pump working on reversed Carnot cycle has COD of 5. If it work as a refrigerator taking 1kW of work input. What will be refrigerating effect? 7

6. a) Define the steady flow process. Explain steady flow energy equation. 7

b) Show that the efficiency of Otto cycle is a function of compression ratio only. 7

7. Explain formation of steam with help of temperature Heat Graph. 14

8. a) Derive an expression for the efficiency of the Carnot Engine. 7

b) For a given compression ratio, the air standard Diesel Cycle is less efficient than air standard Otto cycle. Explain. 7

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