Code No. 119

FACULTY OF ENGINEERING

B.E. 3/4 (Mech.) I – Semester (Main & Backlog) Examination, January 2018

Subject: Applied Thermodynamics

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1. Define and classify Compressors.
2. What are the uses of compressed air?
3. What is multipoint fuel injection system (MPFI).
4. Define specific fuel consumption.
5. Define phenomena of knocking in CI engines.
6. Suggest some methods to control pollution from engine exhaust.
7. Define and classify Boilers.
8. What are Boiler mountings?
9. Explain the process of Reheating for improving efficiency.
10. Explain Modified Rankine cycle.

PART – B (50 Marks)

11 a) What is meant by perfect intercooling in Reciprocating air compressors.

b) A single acting 2 stage air compressor delivers air at 18bar. The temperature and pressure of the air before the compression in LP cylinder are 25^0C and 1 bar. The discharge pressure of LP cylinder is 4.2 bar. The pressure of air leaving the intercooler is 4 bar and the air is cooled to 25^0C. The diameter and stroke of LP cylinders are 40cm and 50 cm respectively. The clearance volume is 5% stroke in both cylinders. The speed of compressor is 200rpm.assuming the index of compression and re expansion in both the cylinders as 1.25, c_p for air =1.004kJ/kg K. Find: (i) Power required to run the compressor (ii) Heat rejected in the intercooler per min.

12 a) Explain the working of Magneto ignition system.

b) A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.000115m^3. The engine consumes 10.5kg of fuel per hour whose calorific value is 41,800kJ/kg. The engine runs at 2500rpm and the efficiency ratio is 0.65. Calculate the average indicated mean effective pressure developed.

13 Explain the stages of combustion in CI engines with the help of P-θ diagram.

14 a) Explain the construction and working of Locomotive Boiler.

b) What are surface condensers. Explain any one type of surface condenser.

15 Steam is expanded in a set of nozzles from 10bar and 200^{o}C to 5bar. What type of nozzle is it. Neglecting the initial velocity find maximum area of nozzle required to allow a flow of 3kg/s under the given conditions. Assume that expansion of steam to be isentropic.

16 a) Give the advantages of multistage compression.

b) Compare air cooling and water cooling systems in IC engines.

17 a) What are the factors influencing the flame speed in engine combustion.
b) What are Boiler accessories?
c) Define nozzle efficiency

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