Code NO. 11102/BL

FACULTY OF ENGINEERING

B.E 3/4 (Mech.) I-Semester (Backlog) Examination, May / June 2019

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. Explain what is perfect inter cooling in Reciprocating air compressors
2. Define (i) Effective Swept volume (ii) Isothermal efficiency
3. What are limitations of simple Carburetor
4. What is significance of Hear Balance Sheet.
5. What are the factors influencing flame speed
6. Draw the theoretical p-θ (Pressure Vs Crank angle) diagram for CI engines
7. Define Boiler, State the advantages and limitations of fire tube boilers over water tube boilers
8. Explain factor of evaporation in Boilers
9. What are different types of Nozzles
10. What is critical pressure ratio in nozzles

Part - B (5x10 = 50 Marks)

11. A single acting 2- stage air compressor delivers air at 18 bar. The temperature and pressure of the air before the compression in LP cylinder are 25oC 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 25oC. The diameter and stroke of LP cyclinder are 40cm and 50cm respectively. The clearance volume is 5% stroke in both cylinders. The speed of compressor is 200 rpm. Assuming the index of compression and re expansion in both the cylinders as 1.25, cp for air = 1.004kj/kg K. Find : (i) Power required to run the compressor (ii) Heat rejected in the intercooler per min 10

12. a) Explain Battery Ignition system 5
    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 2500 rpm and the efficiency ratio is 0.65 Calculate the average indicated mean effective pressure developed. 5

13 a) Explain the stages of combustion in CI engines 5
    b) What is boiler draught 5

14 a) Sketch and explain Babcock and Wilcox boiler 5
    b) What is boiler draught 5

…2

5Steam 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 fine maximum area of nozzle required to allow a flow of 3kg/s under the given conditions. Assume that expansion of steam to be isentropic 10

16 a) Derive the expression for critical pressure in nozzles 5
b) What are bolier mounting sketch and explain any two 5

17 a) Explain knocking in SI engines 5
b) Explain why actual cycle are deviated from air standard cycle. 5

****