Eighth Semester B.Tech Degree Examination

Branch: Automobile Engineering

13:803: Theory of Advanced IC Engines (U)

MODEL QUESTION PAPER

Time: 3 Hrs Max Marks: 100

PART –A

(Answer all questions, Equal marks to all questions)

1. What are the assumptions made in the analysis of fuel air cycles?
2. Differentiate between expansion ratio and compression ratio.
3. What is blow-down loss and pumping loss in an IC engine?
4. List the major factors affecting the thermal efficiency of an engine?
5. Why Turbo -charging is not so popular among conventional Petrol engines?
6. What modifications are required to supercharge a conventional SI engine?
7. Define delivery ratio and trapping efficiency of a two stroke engine?
8. How FFV differ from conventional SI engine vehicles?
9. What are the methods used for the knock control in dual fuel engines?
10. What are the techniques used to achieve VVT?

(10 x2 = 20 Marks)

PART-B

(Answer any one question from each module, equal marks to all questions)

Module - I

11. a) Explain the working of PV and TS diagrams explain the processes in a Diesel Cycle and derive an expression for efficiency of the cycle.

    b) An ideal Diesel engine has a diameter of 15 cm and stroke 29 cm. The clearance volume is 10% of the swept volume. Determine the compression ratio and air standard efficiency of the engine if the cut-off takes place at 6% of the stroke.

12. a) Briefly discuss the effect of Air fuel ratio and compression ratio on thermal efficiency and power output of an engine.

    b) In an ideal constant volume cycle the pressure and temperature at the beginning of compression are 97 kN/m^2 and 40°C, respectively. The compression ratio is 7: 1. The heat supplied during the cycle is 1200 kJ/kg of working fluid. Determine (a) the maximum temperature attained in the cycle, (b) the thermal efficiency of the cycle, and (c) the work done during the cycle/kg of working fluid.

    Assume ? = 1.4 and Cv, = 0.718 kJ/kgK

(20 Marks)

Module II

13. What are the methods used for Improvement of Thermal Efficiency of Open Cycle Gas Turbine Plant? Explain them in detail.
14. What are the different methods of turbo charging? Explain each of them with suitable sketches.

(20 Marks)

Module III

15. a) Explain the difference between the valve timing of a crank case scavenged and super charge two stroke engine?

    b) Explain the terms blow down, delivery ratio, scavenging efficiency and trapping efficiency.
16. With suitable sketches, explain the following scavenging systems

    a) Uni-flow scavenging b) Cross-flow scavenging c) Loop-flow scavenging

(20 Marks)

Module IV

17. What are the major factors affecting combustion in a dual fuel engine? Explain them in detail with the help of typical characteristic curves.
18. a) Explain the advantages and disadvantages of a Stirling engine.

    b) Write a brief note about modern lean burn engines.

(20 Marks)

(4 x 20 = 80 Marks)