C 58389 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2009

ME 04 601—IC ENGINES AND GAS TURBINES

(2004 admissions)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Assume any missing data suitably.

1. (a) Compare four stroke and two stroke cycle engines. List out their merits and demerits.

(b) Compare Otto, Diesel and Dual cycles for the

(i) same compression ratio and heat input.

(ii) same maximum pressure and heat input.

(iii) same maximum pressure and temperature.

(c) Write short notes on cooling system of an IC engine.

(d) Explain the construction and operation of wankel engine with a neat sketch.

(e) Explain briefly the combustion phenomenon in IC engine.

(f) Enlist various methods of controlling diesel knock.

(g) Explain regeneration and reheating in gas turbine.

(h) Write short notes on the performance of a gas turbine.

($8 \times 5 = 40$ marks)

2. (a) A gas engine operating on the ideal Otto cycle has a compression ratio of 6 : 1. The pressure and temperature at the commencement of compression are 1 bar and 27° C. The heat added during the constant volume combustion process is 1170 kJ/kg. Determine the peak pressure and temperature, work output per kg. of air and air standard efficiency. Assume $C_v = 0.717$ kJ/kg. K and $\gamma = 1.4$ for air. (15 marks)

Or

(b) (i) Explain the scavenging process in two stroke engine. Discuss three scavenging processes used in two stroke engine.

(7 marks)

(ii) Explain various stages of the Port timing and valve timing diagram for two stroke and four stroke cycle engine.

(8 marks)

3. (a) (i) What are two types of injection pump that are commonly used in diesel engines ? Explain their working principle with neat sketch.

(8 marks)

(ii) Explain transistorized coil ignition system with a sketch. (7 marks)

Or

Turn over

(b) (i) Explain the principle of operation of a differential with a neat sketch. (7 marks)

(ii) Explain the step-by-step procedure for the heat balance test. (8 marks)

4. (a) (i) Distinguish between Normal combustion and Abnormal combustion. (5 marks)

(ii) What is Additives ? List out the different additives used in diesel engines and explain its importance. (6 marks)

(iii) What are the different methods of fuel rating ? Explain briefly. (4 marks)

Or

(b) Explain the different types of combustion chambers used in IC engine with neat sketch and list out the merits and demerits. (15 marks)

5. (a) Explain the working principle of a simple gas turbine cycle with intercooled cycle, with the schematic diagram and derive the expression for specific work output and maximum efficiency. Draw also the p-V and T-s diagrams of the cycle. (15 marks)

Or

(b) Explain the various types of combustion chamber used in gas turbine with a neat sketch. (15 marks)

[4 × 15 = 60 marks]