D 32010 (Pages 2) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING). DEGREE EXAMINATION, JUNE 2007

ME 04 601—IC ENGINES AND GAS TURBINES

(2004 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer Question 1 and Questions 2 to 5 answer (a), (b) or (c), (d) in each question.

1. (a) Compare two stroke and four stroke engines. State its advantages and disadvantages.

   (b) What do you understand by valve timing diagram ? Explain the need and various events with a neat Sketch.

   (c) Explain the fuel supply system of SI and CI Engines.

   (d) What is supercharging ? What are its limitations ?

   (e) Distinguish between normal and abnormal combustion.

   (f) What are the additives used in petrol engines. State the need for them.

   (g) What do you understand by inter-cooling ? Explain its effects on the Gas turbine power plant.

   (h) What are the merits and demerits of centrifugal and axial flow compressors ?

   (8 × 5 = 40 marks)

2. (a) Explain the ideal and actual cycles for IC engine. (7 marks)

   (b) The compression ratio of an otto cycle is 8. At the beginning of the compression the pressure and temperature are 1 bar and 300 K respectively. The heat transfer to the air per cycle is 1900 KJ/Kg of air. Calculate,

   (i) The pressure and temperature at the end of each process of the cycle.

   (ii) The thermal efficiency.

   (iii) The mean effective pressure.

   (8 marks)

   Or

   (c) Explain different types of scavenging process in Engines. (7 marks)

   (d) In an air standard Diesel cycle, the compression ratio is 16, and at the beginning of isentropic compression, the temperature is 15°C and the pressure is 0.1 Mpa. Heat is added until the temperature at the end of the constant pressure process is 1480°C. Calculate (a) the cut-off ratio, (b) the heat supplied per kg of air, and (c) the cycle efficiency.

   (8 marks)

Turn over

3. (a) Explain ignition system of SI Engines. (7 marks)

(b) Explain different methods of governing of IC Engines. (8 marks)

Or

(c) Explain the exhaust emission from IC engines. Discuss various methods to control it. (8 marks)

(d) What are stratified charge engines ? Explain the working principle with a neat sketch ? (7 marks)

4. (a) Define the following :—

(i) Cetane Number.

(ii) Octane Number.

(iii) Diesel Index.

(iv) Flash & Fire Point.

(8 marks)

(b) Explain the phenomena of ignition delay in IC engine. (7 marks)

Or

(c) Explain the phases of normal combustion. (7 marks)

(d) Discuss the effect of engine variables on diesel knock. (8 marks)

5. (a) Explain regeneration and reheating in gas turbines. (7 marks)

(b) Write short notes on the performance of a gas turbine. (8 marks)

Or

(c) Write notes on combustion chamber design of a gas turbine. (8 marks)

(d) Explain gas turbine design and the limiting factors associated with. (7 marks)