

D 50647

(Pages 2)

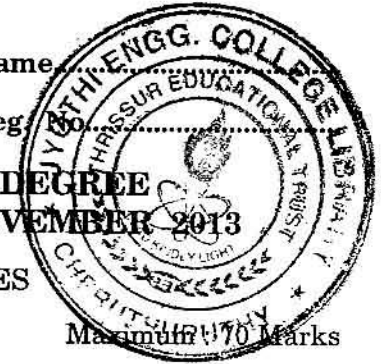
Name

Reg

**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE  
[REGULAR/SUPPLEMENTARY] EXAMINATION, NOVEMBER 2013**

**ME 09 504—IC ENGINES AND GAS TURBINES**

Time : Three Hours



*Answer all questions.  
Assume any missing data suitably.*

**Part A**

*Answer all questions.*

- I. 1 Differentiate four stroke and two stroke engine.  
2 What is exhaust gas composition ?  
3 What is heat balance test ?  
4 Define flame propagation.  
5 Define Intercooling.

(5 × 2 = 10 marks)

**Part B**

*Answer four questions.*

- II. (a) Explain various stages of the valve timing diagram for four stroke cycle engine.  
(b) Explain the fuel supply system of SI and CI engines.  
(c) Explain the battery ignition system with a neat sketch.  
(d) Explain briefly the combustion phenomenon in IC engine.  
(e) Explain the effects of intercooling on the gas turbine power plant.  
(f) Write notes on combustion chamber design of a gas turbine.

(4 × 5 = 20 marks)

**Part C**

- III. (a) Derive an expression for the efficiency of Otto cycle and explain on the effect of compression ratio on the efficiency with respect of ratio of specific heat by means of a suitable graph.

(10 marks)

*Or*

- (b) The compression ratio of an ideal air standard Diesel cycle is 15. The heat transfer is 1465 kJ/kg of air. Find the pressure and temperature at the end of each process and determine the cycle efficiency. What is the mean effective pressure of the cycle, if the inlet conditions are 300 K and 1 bar.

(10 marks)

**Turn over**

IV. (a) (i) What are the different types of cooling systems used in modern automobile explain with neat sketch ?

(7 marks)

(ii) Explain turbo charging in engines.

(3 marks)

*Or*

(b) (i) What are the requirements of the transmission system ?

(5 marks)

(ii) Explain the front longitudinal engine automotive transmission system with neat sketch.

(5 marks)

V. (a) (i) Explain the phenomena of ignition delay in IC engine.

(5 marks)

(ii) Explain the Different Theories of Detonation and explain how to control detonation.

(5 marks)

*Or*

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

(10 marks)

VI. (a) Explain the working principle of a simple gas turbine cycle with reheat 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.

(10 marks)

*Or*

(b) (i) Explain the working principle of a centrifugal compressor with suitable diagram.

(7 marks)

(ii) What are the types of nozzles used in an aircraft engine ?

(3 marks)

[4 × 10 = 40 marks]