Roll No. .....

24260

B. Tech. 5th Sem.

(Mechanical Engg.) VII

Examination – December, 2013

INTERNAL COMFUSION ENGINES & GAS TURBINES

'F' Scheme

Paper : ME-307-F

Time : Three hours] ***[Maximum Marks : 100***

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any ***five*** questions in all. ***Question number one is compulsory*** and selecting at least ***one*** question from each section.

1. (a) What do you mean by engine and how I. C. engines are classified? 4

(b) What are the various type of ignition systems? 4

(c) What are the various variables affecting delay period in internal combustion engines. 4

(d) What do you mean by BHP and IHP? 4

(e) Define surging and choking. 4

SECTION – A

2. Explain the various air standard cycles like otto, diesel and dual combustion cycles with assumption. 20

3. The temperature and pressure of the air at the beginning in a engine working on dual cycle are 100°C and 1 bar. The compression ratio is 13. The maximum pressure of the cycle is limited 80 bar. The amount of heat added is 1700kJ/kg of air. Determine the temperatures at salient points of the cycle and ideal thermal efficiency. Take $\gamma = 1.4$ for air. 20

SECTION – B

4. What is lubrication? Mention its types. Explain with suitable examples. 20

5. (a) Explain the combustion stages of C. I. engines. 10

   (b) Name various theories of detonation. Explain the Pre-Ignition with neat sketch. 10

SECTION – C

6. The following particulars were obtained in a trial on a 4-stroke gas engine when trial is conducted for one hour .1. Revolutions= 16000, 2. Missed cycles=600, 3. Net brake load= 1600N, 4. Brake circumference = 4m , 5. MEP=8 bar, 6.Gas consumption=2200 liters, C. V. of gas=20kJ/liter. Take d=25cm, L=40cm and R_c=6.5 for the engine and find (a) I.P. and B.P. (b) bsfc (c) η_{bth} and η_r. 20

7. (a) Discuss in what respects the CI engines are superior to SI engines. 10

(b) Explain different categories of SI emissions. Also explain various factors affecting exhaust emission. 10

SECTION – D

8. Explain the various types of Rotary Compressors. 20

9. Explain the Brayton cycle along with its practical use and mathematical derivation. 20