B.Tech 5th Semester (ME) F-Scheme

Examination, December–2017

INTERNAL COMBUSTION ENGINE AND GAS TURBINES

Paper–ME–307–F

Time allowed : 3 hours] *[Maximum marks : 100*

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

1. (a) What is air-fuel ratio and Detonation? 4

(b) Define the working of catalytic converter and show by way of figure where it is placed. 4

(c) What is a carburetor? 2

(d) Difference between two stroke and four stroke engine. 2

(e) What is octane number of petrol? 2

(f) What is the efficiency of Sterling Cycle? 2

(g) Define choking. 2

(h) What do you mean by IHP? 2

Section–A

2. (a) What are the assumptions made in air standard cycle? 10

(b) Derive an expression for the calculation of air fuel ratio for the carburetor. 10

3. What are the Requirements of ignition system? Discuss the various types of ignition systems ignition. 20

Section–B

4. Name various types of Lubrication systems. Explain the Mist lubrication system. Compare the Mist Lubrication with other Lubrication systems. Also state the essential requirement of a lubrication system. 20

5. (a) Explain the phenomenon of knock in CI Engine and compare the same with SI engine knock. 10

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

Section–C

6. (a) A two stroke diesel engine was motored when meter reading was 1.5kW. Then the test on the engine was carried out for one hour and following observations were recorded.1. Brake torque = 120Nm, 2. RPM = 600, 3. Fuel used = 2.5 kg, 4. C.V. of fuel = 40.3 MJ/kg, 5. Cooling water used = 818 kg, 6. Rise in cooling water temperature = 10°C, 7. Exhaust gas temperature = 345°C, 8. Room temperature = 25°C, 9. A: F used = 32:1 Take C_{cg} = 1.05 kJ/kg.K
   Determine (a) B.P., I.P. and mechanical η and indicated thermal η.

   (b) Draw up heat balance on minute and percentage basis. 20

7. (a) Explain briefly various alternate fuels that can be used for I.C. engines. 10

   (b) Discuss the various alternative fuels that can be used in I.C. Engines. 10

Section–D

8. What are compressors? Explain rotary and centrifugal compressors. 20

9. Explain the components of a gas turbine plant. Compare the open and closed types of gas turbine plants. 20