9. Explain the methods that can adopted for improvements of the basic gas turbine cycle. 20

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Roll No. ....................

# 24260

## B. Tech. 5th Semester (ME)

## Examination – December, 2016

### INTERNAL COMBUSTION ENGINES AND GAS TURBINES

#### Paper : ME-307-F

Time : Three Hours ]　　　　　　[ Maximum Marks : 100

*Before answering the question, 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 1 is *compulsory* and selecting at least *one* question from each Section.

1. (a) What are the various Assumptions made in various air standard cycle ? 4

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

   (c) What is a carburetor ? 2

   (d) Explain the Euro norms for pollution. 2

(e) What is octane number of petrol ? 2

(f) Explain the various methods of scavenging. 2

(g) Define choking. 2

(h) What do you mean by IHP ? 2

## SECTION – A

2. (a) State the essential requirement of a good injection system. 10

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

3. The temperature and pressure of the air at the beginning in a engine working on dual cycle are 100°C and I 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 cooling system ? Mention its types. What are disadvantages of overcooling ? Discuss the various method of cooling. 20

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

(b) Explain the cetane rating of fuels. 10

## SECTION – C

6. A 4-cylinder petrol engine has a bore of 5.7 cm and stroke 9 cm .Its rated speed is 2800 RPM and it is tested at this speed against a brake which has torque arm of 0.356 m. Net brake load is 155 N and fuel consumption is 6.74 Its/hr. The specific gravity of petrol used is 0.735 and it has low calorific value of 44200 KJ/KG. A Morse test is carried out and cylinders are cut in order of I, 2, 3, 4 with corresponding brake loads of 112,106.5, 104.2,111 N respectively. Calculate for this speed, engine torque, Bmep., Brake thermal efficiency, specific fuel consumption, Mechanical efficiency and Imep. 20

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

(b) Describe the various methods of emission control. 10

## SECTION – D

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