



Reg. No. :

Name :

**Eighth Semester B.Tech. Degree Examination, December 2017
(2008 Scheme)**

08.806.16 : DESIGN OF IC ENGINES (MPU)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions from Part A.

(10×4=40 Marks)

1. Sketch the cross section of a single cylinder spark ignition engine and mark the important parts.
2. What is meant by cylinder row and cylinder bank ?
3. Define the following :
 - i) engine and
 - ii) heat engine
4. Classify the internal combustion engine with respect to
 - i) cycle of operation
 - ii) types of fuel used
 - iii) method of charging the cylinder
 - iv) types of ignition.
5. What is a two-stroke engine and how does it differ from a four stroke engine ?
6. What is an opposed piston engine ? Explain.
7. Define the following :
 - i) delivery ratio
 - ii) trapping efficiency
 - iii) relative cylinder charge
 - iv) scavenging efficiency.
8. Briefly explain the classification of two stroke engines based on scavenging process.
9. What is smoke and explain the measurement of smoke ?
10. What are the types of piston rings used in I.C engines ?



PART – B

Answer **one** question from **each** Module.

(20×3=60 Marks)

Module – I

11. a) A four cylinder, four stroke spark ignition engine has a bore of 80 mm and stroke of 80 mm. The compression ratio is 8. Calculate the cubic capacity of the engine and the clearance volume of each cylinder. What type of engine is this ?
- b) An engine with 80 percent mechanical efficiency develops a brake power of 30 kW. Find its indicated power and frictional power. If frictional power is assumed to be constant, what will be the mechanical efficiency at half load ?

OR

12. A tank of volume 0.1 m^3 contains 4 kg nitrogen, 1.5 kg oxygen and 0.75 kg carbon dioxide. If the temperature of the mixture is 20°C , determine
- the total pressure of the mixture
 - the gas constant of the mixture. (Given that $R_{\text{N}_2} = 296.8 \text{ J/kgK}$, $R_{\text{O}_2} = 259.83 \text{ J/kgK}$ and $R_{\text{CO}_2} = 188.9 \text{ J/kgK}$.)

Module – II

13. Explain with neat sketches the two different types of two stroke engines.

OR

14. Air injection engine is 370 mm bore and 510 mm stroke expected to deliver 74.6 kW cylinder are its normal speed of 200 rpm which correspond to 4.1 BMEP. What should be the timing and size of the inlet port ?

Module – III

15. a) Explain the basic principle and working of hydraulic dynamometer.
b) With a neat sketch explain an Eddy current dynamometer.

OR

16. Design a CI engine piston for a single acting 4S diesel engine for the following data : Bore = 100 mm, Stroke = 120 mm, Maximum gas pressure = 5 N/mm^2 , Brake mean effective pressure = 0.65 N/mm^2 , mass of fuel consumption = 0.227 kg/k Whr , Speed = 2200 rpm. Assume suitable datas.
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