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Total No. of Pages : 01

Total No. of Questions : 08

M.Tech.(ME) (Sem.-3)

ADVANCED INTERNAL COMBUSTION ENGINES

Subject Code : MME-559

Paper ID : [E0433]

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.
3. Assume any data missing.

1. In an oil engine working on dual combustion cycle the temperature and pressure at the beginning of compression are 90°C and 1 bar. The compression ratio is 13:1. The heat supplied per kg of air is 1675 kJ, half of which is supplied at constant volume and half at constant pressure. Calculate (a) the maximum pressure in the cycle and (b) the percentage of stroke at which cut off occurs. Take γ for compression 1.4, $R = 0.287$ kJ/kg K and c_v for products of combustion $0.71 + 20 \times 10^{-5}$ T.
2. Discuss the effect of the following variables on pressure and temperature and salient points of Otto cycle on the basis of fuel-air cycle, (a) Compression ratio, (b) Fuel-air ratio.
3. What are different types of scavenging process? Explain with sketches different scavenging arrangements based on charged flow.
4. List the basic requirements of an ideal gasoline. Discuss the desirable properties of S.I. engine fuels.
5. Describe with the help of suitable sketches (a) jerk pump system, (b) common rail system and (c) distributor system. Discuss their relative advantages and disadvantages.
6. Explain how the induction swirl is created and discuss the requirements of injector with this type of swirl.
7. a) Discuss different properties of ethanol and methanol and compare them with gasoline.
b) Describe various types of alternative fuels for automotive engines.
8. Write notes on :
a) Characterization of flow.
b) Fuel line hydraulics.