

(Following Paper ID and Roll No. to be filled in your
Answer Books)

Paper ID : 147854

Roll No.

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B.TECH.

Theory Examination (Semester-VIII) 2015-16

COMPUTER SIMULATION OF IC ENGINES

Time : 3 Hours

Max. Marks : 100

Section-A

1. Attempt all questions :

(2×10=20)

- (a) Write the condition for maximum and minimum tractive force.
- (b) What are the types of partial balancing locomotives?
- (c) Define URP and HRP.
- (d) Draw the actual cycle and theoretical cycle of 4-stroke SI engine.
- (e) What is pressure crank angle?
- (f) Write the types of simulation.

- (g) What is progressive combustion?
- (h) Explain constant pressure adiabatic combustion.
- (i) What are the main pollutants in 2 stroke IC engines?
- (j) Why the actual cycle of SI engine differ from ideal cycle?

Section-B

2. Attempt any FIVE questions. (10×5=50)

- (a) Explain the deviation between actual and ideal cycle on the basis of maximum pressure and temperature. An air standard otto cycle has a compression ratio of 6. The initial temperature and pressure are 293K and 1 bar. The heat added during constant volume is 1.6 MJ/Kg. find the air standard efficiency and mean effective pressure.
- (b) Explain the various modes of engine computer simulation.
- (c) Explain different heat transfer modes with suitable sketch.
- (d) Define the full throttle and part throttle simulation of SI engine with neat sketch.
- (e) Discuss the simulation combustion phenomena. Write down the effect of by product emitting in combustion.

- (f) Discuss the temperature drop due to fuel vaporization. What is the effect of it on the combustion?
- (g) Draw the pressure crank angle diagram and other engine performance.
- (h) Explain the engine friction model with neat sketch.

Section-C

Note : Attempt any TWO questions.

(15×2=30)

- 3. A four cylinder reciprocating engine has speed of 300 rpm and 250 mm stroke. If the mass of reciprocating parts is 80 kg and mass of revolving parts is at 150 mm radius 45 kg. if two forth of the reciprocating parts and all revolving parts are to be balanced, find
 - i. The balance required at 400 mm radius.
 - ii. The residual unbalanced force when crank has rotated 45° TDC.
- 4. If the Butane (C_4H_{10}) is burnt with 61 % excess air which enters a combustion chamber at $25^\circ C$. Assuming complete combustion and total pressure 1 atm determine,
 - i. The air fuel ratio

- ii. The percentage of carbon dioxide by volume in the product.
 - iii. The dew point temperature of the product.
5. Simulate the P- ϕ diagram taking the performance of the engine simulation.

