



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

**PAPER ID : 147854**

Roll No.

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## B. Tech.

### (SEM. VIII) THEORY EXAMINATION, 2014-15 COMPUTER SIMULATION OF IC ENGINES

Time : 3 Hours]

[Total Marks : 100

*Note: (1) Attempt all questions. Be precise in your answer. Draw neat and clean diagram where ever required. Assume data suitably if necessary.*

1. Attempt any **Four Parts** Of the following: (5×4 =20)
  - a) Define the constant volume adiabatic combustion process.
  - b) A single cylinder dual pressure engine works with internal conditions of one bar and 310 K. the compression ratio is 10 and total heat added is 2805 kJ/kg of change. The maximum pressure is limited to 70 bars. Calculate mean effective pressure and thermal efficiency.
  - c) Explain the heat of reaction in brief and losses due to dissociation.
  - d) Write down the deference's between actual cycle and ideal cycle on the basic of efficiency variation.
  - e) Explain the simulation factors in briefly
  
2. Attempt any **Two Parts** Of the following: (10×2 =20)
  - a) Discuss and explain briefly the measurement of heat of reaction parameter  $U_{rp}$  and  $H_{rp}$  with the help of bomb calorimeter.
  - b) Explain the adiabatic flame and common flame and also write down the temperature calculation equations.

- c) Explain the following:-
  - a) Variation of tractive force
  - b) Swaying Couple
  - c) Hammer Blow

3. Attempt any **Two Parts** Of the following: (10×2 =20

- a) Show the effect of spark advance on power output for different combustion model with neat sketch.
- b) Discuss the full throttle operation with neat sketch briefly and also show the effect of spark advance on power output for various duration of combustion with sketch.
- c) An Otto cycle working on air has a compression ratio 6 and starting conditions are 40°C and 1 bar. The peak pressure is 50 bars. Draw the cycle on P-V and T-S conditions if compression and expansion follow the  $p v^{1.25} = C$ . calculate mean effective pressure and heat aided per kg of air

4. Attempt any **Two Parts** Of the following: (10×2 =20

- a) Explain the heat reaction process of internal combustion engine and also discuss the different type of heat reaction
- b) Discuss the P-φ diagram with neat sketch in detail and also write down the effect of engine speed variation.
- c) Explain the comparison of power cycle on the basis of following factor.
  - a) Same Compression Ration And Heat Input
  - b) Same Maximum Pressure And Temperature
  - c) Constant Maximum Pressure And Heat Input

5. Attempt any **Two Parts** Of the following: (10×2 =20

- a) Discuss the balancing of Two stroke engine in briefly and also discuss the primary and secondary unbalanced force.
- b) Explain the different heat transfer models briefly with sketch and also write down it's the effect on heat transfer.
- c) Explain the heat balance sheet of engine and also write the efficiency calculation equations