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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. - Mechanical Engineering

Make-up Examination; Jan / Feb - 2017

I.C. Engines

Time: 3 hrs

Max. Marks: 100

Note: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.

ii) Assume suitably missing data, if any.

UNIT - I

- 1 a. State the assumptions of Fuel-Air cycle. 6
- b. What will be the effect on the efficiency of an Otto cycle having a compression ratio of 8, if C_v increases by 1.6%? 8
- c. Define the terms : 6
 - i) Octane number
 - ii) Cetane number with specific reference to the type of engine.
- 2 a. Explain the term "Dissociation". Draw the relevant graph of effect of Dissociation on temperature for difference Air-Fuel ratio. 10
- b. Discuss the effect of vegetable oil as fuel on fuel injection equipment in a CI engine and on performance. 6
- c. Hydrogen can be cleaner fuel for IC Engines, but has limitations. Discuss. 4

UNIT - II

- 3 a. Draw the sketch of a simple carburetor and name the parts. 10
- b. Discuss the limitations of a carburetor system. 5
- c. Define 'knock' in SI Engine and discuss its effect with pressure-crank angle diagram. 5
- 4 a. Draw the pressure-crank angle diagram of SI engine and explain the stages of combustion. 10
- b. Draw the sketch of 3 different types of combustion chambers of SI engine. 6
- c. Name the factors which influence flame speed in SI engines. 4

UNIT - III

- 5 a. Draw the pressure-crank angle diagram of CI engine and explain the stages of combustion. Mark the occurrence of the following in the diagram in terms of crank angle and explain their relevance : 12
 - i) Point of measurable pressure-rise
 - ii) Peak combustion pressure
 - iii) Start of after burning.
- b. Distinguish between induction swirl and compression swirl with respect to different CI combustion chambers. 8

- 6 a. Draw the sketch of DI and IDI types of combustion chambers in a CI engine showing injector spray/s in each case. Discuss important advantages and disadvantages in each case. 12
- b. Define 'Delay Period' in a CI engine. Explain the two distinct types. 8

UNIT - IV

- 7 a. Explain with neat sketch, the liquid cooling system in IC engines. 10
- b. Discuss the advantages and disadvantages of Air cooled and Liquid cooling system. 10
- 8 a. Explain the function of MPFI system with suitable block diagram. 10
- b. Discuss the role of Air flow sensor in MPFI system. Explain principle. 5
- c. How does Lambda feedback mechanism work in MPFI system? Explain principle. 5

UNIT - V

- 9 a. Some emission constituents in CI and SI engines are common and some pronounced in each type. Name all these and discuss effects. 10
- b. SI engine catalytic convertor efficiency Peaks at Lambda equal to 1. Justify with suitable graphs. 10
- 10 a. Sketch and explain three types of super charges. 12
- b. Which situation in combustion chamber is congenial for NO_x formation? Describe 'EGR' method to control NO_x emission. 8

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