



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

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. - Mechanical Engineering

Semester End Examination; Dec. - 2015

Internal Combustion Engines

Time: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.

PART - A

1. a. State the assumptions made for fuel air cycle analysis. 5
- b. Show that variation of efficiency of Otto cycle with variation of C_v as,

$$\frac{d\eta}{\eta} = -\left(\frac{1-\eta}{\eta}\right)(\gamma-1)\ln r \frac{dc_v}{c_v}$$
 With usual notations. 5
- c. Explain the effect of dissociation on brake power for SI engine and why dissociation effect is not pronounced in CI engine. 10
2. a. Explain the effect of following engine variables on flame propagation : 8
 - i) Fuel – air ratio
 - ii) Compression Ratio
 - iii) Turbulence
 - iv) Engine load.
- b. What is detonation? Explain any tow effects of detonation. 8
- c. How SI engine fuels are rated? Explain. 4
3. a. Explain the stages of combustion in CI engine. 10
- b. What is diesel knock? Explain the methods of controlling diesel knock. 10
4. a. Describe the basic requirements of SI engine combustion chamber. 4
- b. Explain with a neat sketch F head and L head combustion chamber. 10
- c. Explain the role of swirl in diesel engines. 6

PART - B

5. a. Briefly explain the alternative fuels for diesel engines. 8
- b. Explain the influence of chemical structure on knocking in diesel engines. 4
- c. List the merits and demerits of alcohol as an alternate fuels for IC engines. 8
6. a. What are the functional elements required in a fuel injection system? With a neat sketch explain the working of Jerk pump injection system. 10
- b. Explain with a neat sketch thermostat controlled cooling system. 10
7. a. What is super charging? What are its objectives? 6
- b. What are the requirements of multifuel engine? List the difficulties associated with multifuel operation. 6
- c. Explain the working of Wankel rotary combustion engine. 8

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| 8 a. | Explain the mechanism of formation of CO and NO _x in petrol engine. | 6 |
| b. | Explain with suitable sketch the catalytic converter. | 8 |
| c. | Explain the effects of engine emissions on human health. | 6 |

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