



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

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. - Automobile Engineering

Semester End Examination; Dec - 2016/Jan - 2017

Automotive Air Pollution and Control

Time: 3 hrs

Max. Marks: 100

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

ii) Figures/ Sketches are to be drawn using pencil only.

UNIT - I

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|------|---|----|
| 1a. | Describe the Mechanism of NO _x formation in SI and CI engines and also summarize the reasons for higher NO ₂ emission from CI engine. | 10 |
| | b. With graph, explain the effect of Ignition timing and burnt gas fraction on NO _x formation. | 10 |
| 2 a. | Discuss the emission of HC in diesel engine by too rich and too lean mixture. | 10 |
| | b. Distinguish between SI engine and a stratified charged SI engine. | 10 |

UNIT - II

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|------|--|----|
| 3 a. | With schematic diagram, explain the fuel evaporation control for a petrol injection Air-fuel mixture system. | 10 |
| | b. Discuss the role of compression ratio, cylinder size and ignition timing on reduction of pollutants from SI engine. | 10 |
| 4 a. | Differentiate between two stroke and four stroke engine crank case; also explain positive crank case ventilation system. | 10 |
| | b. Discuss the effect of engine speed, exhaust gas recirculation and Turbo charging on emission by CI engines. | 10 |

UNIT - III

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|------|--|----|
| 5 a. | Explain the effect of following fuel properties on emission : | 10 |
| | i) Fuel density ii) Volatility iii) Octane number. | |
| | b. Discuss the effect following fuel properties on CI engine emissions : | 10 |
| | i) Addition of water ii) Aromatic content iii) Viscosity. | |
| 6 a. | Explain the constant volume sampling. | 5 |
| | b. Discover the effect of the following on Human health : | 9 |
| | i) NO _x ii) CO iii) HC. | |
| | c. Differentiate between TCD and FID. | 6 |

UNIT - IV

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|------|--|---|
| 7 a. | Sketch and explain the working of peletised type catalyst converter. | 7 |
| | b. What is catalyst light off? | 3 |

- c. With neat sketch, explain the vacuum operated exhaust gas recirculation system. 10
 - 8 a. Sketch and explain the working of catalytic wire mesh particulate trap and manifold. 10
 - b. Distinguish between thermal reactor and Catalytic converter. 5
 - c. Discuss selective catalytic reduction. 5
- UNIT - V**
- 9 a. Sketch and explain the gas chromatograph. 10
 - b. With schematic diagram, explain the working of chemiluminescence type NO_x analyzer. 10
 - 10 a. Sketch and explain the construction and working of Bosch smoke meter. 10
 - b. Name the different instruments used for different pollutants. 5
 - c. Discuss the test cycles for light and heavy duty vehicles. 5

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