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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

- 1a. Describe the Mechanism of NO_x formation in SI and CI engines and also summarize the reasons for higher NO₂ 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

- 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

- 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

- 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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