



## 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. - 2015**

**Automotive Air Pollution and Control**

Time: 3 hrs

Max. Marks: 100

- Note:** i) Answer any **FIVE** full questions, selecting at least **TWO** full questions from each **part**.  
 ii) Figures/ Layouts are to be drawn using pencil only.  
 iii) Issue of specific Handbooks, Charts Tables.....

### PART - A

- 1 a. With the help of neat graph of speed versus time, explain the ECE cycle used for regulatory test. 10
- b. Explain how the traffic conditions and vehicle maintenance influence the overall pollution of atmosphere. 10
- 2 a. Explain the mechanism of formation of oxides of nitrogen in engines, with reactions. 10
- b. Discuss the effect of following parameters on HC emissions from SI engine, 10
  - i) Flame quenching at walls
  - ii) Crevices
  - iii) Absorption and desorption in engine oil
- 3 a. Explain the engine design modifications adopted to control emissions. 10
- b. Explain with the help of neat sketch the working of exhaust gas recirculation. 10
- 4 a. Discuss the effect of the following on emission: 10
  - i) Alternative Fuels
  - ii) Lubricants
- b. Discuss the effects of the following properties on emission : 10
  - i) Volatility
  - ii) Fuel density
  - iii) Octane and Cetane number
  - iv) Additives

### PART - B

- 5 a. What is catalytic convertor? Explain the construction and workings of catalytic convertor with neat sketch also mention their merits and demerits. 10
- b. Write a note on catalyst light-off. 4
- c. With schematic diagram explain the working of thermal reactor for HC and Co oxidation. 6
- 6 a. Explain in detail the effect of air pollution on human health. 10
- b. Discuss the effect of air pollution on animals and plants. 10
- 7 a. Briefly discuss the following sampling methods : 16
  - i) Electrostatic precipitation
  - ii) Sedimentation
  - iii) Centrifugal methods
  - iv) Filtration
- b. Differentiate volumetric and gravimetric method of sampling analysis. 4
- 8 a. Explain with neat sketch the construction and working of NDIR analysers. 6
- b. What are the principles of smoke meters? Explain any two in detail with neat sketches. 8
- c. Explain the gas chromatographic method with the help of a neat sketch. 6