

For Syllabus, Question Papers, Notes & many More

AT6703 AUTOMOTIVE POLLUTION AND CONTROL

DETAILED SYLLABUS

UNIT I INTRODUCTION

Pollutants – sources – formation – effects of pollution on environment - human – transient operational effects on pollution – Regulated – Unregulated emissions - Emission Standards.

UNIT II EMISSIONS IN SI ENGINE

Chemistry of SI engine combustion – HC and CO formation in SI engines – NO formation in SI engines – Smoke emissions from SI engines – Effect of operating variables on emission formation.

UNIT III EMISSIONS IN CI ENGINE

Basics of diesel combustion – Smoke emission and its types in diesel engines – NOx emission and its types from diesel engines – Particulate emission in diesel engines. Odor, sulfur and Aldehyde emissions from diesel engines – effect of operating variables on emission formation.

UNIT IV CONTROL TECHNIQUES FOR REDUCTION OF EMISSION

Design modifications – Optimization of operating factors – Fuel modification – Evaporative emission control - Exhaust gas recirculation – SCR – Fumigation – Secondary Air injection – PCV system – Particulate Trap – CCS – Exhaust treatment in SI engines –Thermal reactors – Catalytic converters – Catalysts – Use of unleaded petrol.

UNIT V TEST PROCEDURE, INSTRUMENTATION & EMISSION MEASUREMENT

Test procedures CVS1, CVS3 – Test cycles – IDC – ECE Test cycle – FTP Test cycle – NDIR analyzer – Flame ionization detectors – Chemiluminescent analyzer – Dilution tunnel – Gas chromatograph – Smoke meters –SHED test.

TEXT BOOKS

1. Springer and Patterson, "Engine Emission", Plenum Press, 1990.
2. 2. Pundir. B.P., " IC Engines Combustion and Emissions" Narosa Publishers, 2010

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REFERENCES

1. Ramalingam. K.K., "Internal Combustion Engines", Scitech Publications, 2003.
2. Ganesan,V., "Internal Combustion Engines", Tata McGraw Hill Co., 1994.
3. SAE Transactions, "Vehicle Emission", 3 volumes, 1982. 4. Obert,E.F., "Internal Combustion Engines", 1982.
5. Taylor,C.F., "Internal Combustion Engines", MIT Press, 1972.
6. Heywood,J.B., "Internal Combustion Engine Fundamentals", McGraw Hill Book Co., 1995.
7. Automobiles and Pollution SAE Transaction, 1995.

OBJECTIVES

The main objective of this course is to impart knowledge in automotive pollution control. The detailed concept of formation and control techniques of pollutants like UBHC, CO, NO_x, particulate matter and smoke for both SI and CI engine will be taught to the students. The instruments for measurement of pollutants and emission standards will also be introduced to the students. At the end of the course the students will have command over automotive pollution and control.