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B.E/B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS APRIL/MAY 2012

MECHANICAL ENGINEERING BRANCH

VII SEMESTER
(REGULATIONS 2008)

ME 9036 - ADVANCED INTERNAL COMBUSTION ENGINES

Time: 3 hrs

Max Mark: 100

Answer ALL Questions

Part - A (10 x 2 = 20 Marks)

1. How knocking can be avoided in SI engines?
2. What do you understand by Direct injection in SI engine?
3. Differentiate between Direct and Indirect injection.
4. What do you understand by the term supercharging?
5. What is a driving cycle?
6. What is the emission norm currently applicable for automobiles in Chennai?
7. List the merits of LPG as a fuel for SI engine.
8. Write four merits of hydrogen as a fuel for i.c. engine.
9. What is stratified charge engine?
10. Expand - HCCI & CRDI.

Part - B (5 x 16 = 80 Marks)

11. Explain the multipoint fuel injection system for a S.I. engine with a sketch. State the merits and demerits of multipoint injection over a throttle body injection (12+4)

- 12 a)i) Describe the process of combustion in CI engines and also explain the various stages of combustion with P- θ diagram. (10)
- ii) Sketch the various type of combustion chamber used in C.I. engines. (6)

(Or)

- (b)i) Explain with sketches the spray structure and spray penetration of a Diesel fuel. (12)
- ii) Discuss briefly how knocking occurs in CI engines. How it can be minimised. (4)

- 13 (a)i) Sketch a three way catalytic converter and explain how it is able to reduce the emissions in the exhaust gas (10)
- ii) Explain the formation of NO_x emission and how it can be controlled (6)

(Or)

- (b) Explain with neat sketch (i) Chemiluminescence method of measuring oxides of nitrogen (ii) NDIR method of measuring Carbon monoxide. (16)

- 14 (a)i) What are the merits and demerits of using CNG in CI engine (8)
- ii) Explain with neat sketch any one method by which hydrogen can be used in CI engine (8)

(Or)

- (b)i) What are the methods by which alcohol can be used in SI engines (4)
- ii) Compare any *five* properties of Hydrogen, LPG and CNG. (8)

- 15 (a) Describe in detail the different types of HEV's with necessary schematic of the same. (16)

(Or)

- (b) Describe the CRDI system and how it injects fuel in a CI engine (16)