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B.E/B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS APRIL/MAY 2013

MECHANICAL ENGINEERING BRANCH

17

VI SEMESTER
(REGULATIONS 2009)

ME 9036 - ADVANCED INTERNAL COMBUSTION ENGINES

Time: 3 hrs

Max Mark: 100

Answer ALL Questions

Part - A (10 x 2 = 20 Marks)

1. List out the A/F ratios for a SI engine during cold start and cruising conditions.
2. Differentiate between PFI and TBI.
3. List out the factors affecting the delay period.
4. What is Diesel knock? Indicate the same on a p- θ diagram.
5. List out the major sources of emission in CI engine.
6. What is the emission norm currently applicable for automobiles in Chennai?
7. What is CNG? State its chief constituent.
8. Write any two merits of alcohol as a fuel for SI engines.
9. Expand CRDI?
10. Mention the principle on which a fuel cell works.

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) Explain with the help of a p- θ diagram the various stages of combustion in a CI engine. (12)

ii) Compare DI and IDI diesel engines. (4)

(Or)

(b)i) Describe the combustion chambers used in CI engines with a neat sketch. (10)

ii) Discuss the structure of a diesel fuel spray with a neat sketch. (6)

13 (a) Plot the variation of three major pollutants in a SI engine versus air-fuel ratio and explain their variation under different air-fuel ratios. (16)

(Or)

(b). Explain with neat sketch (i) Chemiluminescence's method of measuring Oxides of nitrogen (ii) NDIR method of measuring Carbon monoxide. (16)

14 (a)i) What are the advantages and disadvantages of using hydrogen in CI engine? (6)

ii) Explain with neat sketch the different techniques of using alcohol in CI engines. (10)

(Or)

(b)i) Explain various components used in a CNG kit used for a CNG-diesel dual fuel operated CI engine. (12)

ii) Compare any four properties of Ethanol & LPG. (4)

15 (a)i) Describe the characteristics of a HCCI engine with a schematic. (12)

ii) What is a lean burn engine? Explain its advantages & disadvantages. (4)

(Or)

(b). Describe the operation of a fuel cell with a neat sketch. Also list out the different types of fuel cells and their applications. (12+4)