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**Question Paper Code : S 4703**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Sixth Semester

Mechanical Engineering

ME 043 — ADVANCED IC ENGINEERING

(Regulation 2001)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why is there maldistribution in multi-cylinder engines?
2. Why is there more variation of indicator diagram at the weak end of mixture?
3. Define delay period with respect to a CI engine.
4. List out the advantages of direct injection chambers over indirect injection chambers in CI engines.
5. Give the zeldovich reaction mechanism of NO<sub>x</sub> formation.
6. What are the international accepted methods for measuring the NO<sub>x</sub>, CO, HC and aldehydes?
7. Mention the advantages of LPG as IC engine fuel.
8. What is the effect of adding methanol on octane number of gasoline?
9. What is meant by stratified charge engines?
10. List the advantages of fuel injection in an SI engine.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the homogeneous mixture role in the SI engine. (5)  
(ii) Explain the stages of combustion in SI engines. (11)

Or

- (b) (i) Explain the normal and abnormal combustion in SI engine. (5)  
(ii) Explain any one type of the combustion chamber used in SI engine. (11)

12. (a) What are the design and operating factors affecting delay period? Describe.

Or

- (b) What are the different spray region in fuel spray for D.I. engines? Explain briefly the lean flame region with neat sketch.

13. (a) (i) Explain with simple sketches the following combustion chambers used in CI engines.  
(1) Pre combustion chamber  
(2) Air-cell chamber. (10)  
(ii) Discuss the effects of spray structure and spray penetration in CI engine combustion. (6)

Or

- (b) (i) Discuss the Various types of combustion chambers uses in SI engines with simple sketches. (8)  
(ii) Write short notes on thermodynamic analysis of CI engine combustion. (8)

14. (a) (i) Discuss the advantages and disadvantages of using hydrogen as IC engine fuel.  
(ii) Why is alcohol not a suitable fuel for diesel engines? Explain with sufficient reasons. (10 + 6)

Or

- (b) (i) What are the major advantages of blended fuel?  
(ii) Explain the modifications required in the engine to use alcohol blended gasoline as fuel with proper reasons. (4 + 12)

15. (a) Describe the working of the gasoline direct injection engine and compare it with homogeneous charged engine.

Or

- (b) Describe the working of the stratified charge engines with neat sketch and list out the advantages and disadvantages.
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