Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20796

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Eighth Semester

Mechanical Engineering

ME 6016 — ADVANCED IC ENGINES

(Regulations 2013)

(Common to PTME 6016 — Advanced I.C. Engines for B.E. (Part-Time) – Seventh Semester – Mechanical Engineering – Regulations 2014)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the types of injection systems used in SI engines.

2. List two merits of a fuel injection system as compared to a carburettor.

3. What is turbocharging? Is it advantageous for a CI engine?

4. List some major components of a Diesel fuel direct injection system.

5. What is selective catalytic reduction? It is used to control which pollutant?

6. Mention the current emission norm followed in metropolitan cities in India.

7. List atleast two properties of LPG.

8. What are the merits of alcohol as a fuel for SI engines?

9. What is unique about HCCI combustion?

10. What is a hybrid electric vehicle? Give an example.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the port fuel injection system in a SI engine with a schematic. (10)

(ii) Draw the wall guided mode of direct injection combustion chamber for a SI engine. (6)

Or

(b) (i) Draw a schematic of different SI engine combustion chambers and their characteristics. (10)

(ii) List the nominal air-fuel ratios in a SI engine during- cold start, cruising, idling and acceleration. (6)

12. (a) (i) Describe with p-theta diagram how air-fuel mixture burns in a CI engine. (10)

(ii) Depict atleast two types of modern day CI engine combustion chamber shapes. (3+3)

Or

(b) How does a fuel spray interact with surrounding air in a CI combustion chamber? Support your detailed answer with suitable sketches. (8+8)

13. (a) Explain the sources and mechanism of formation of oxides of nitrogen in a SI engine. How they can be controlled? (16)

Or

(b) (i) Briefly discuss about selective catalytic reduction process with a suitable sketch. (8)

(ii) What is a driving cycle? Explain its significance with a schematic. (8)

14. (a) (i) List the parameters which makes ethanol a suitable fuel for SI engine and compare any four of its properties with gasoline. (4+4)

(ii) Mention atleast four properties of Hydrogen and natural gas. (4+4)

Or

(b) (i) Give the suitability of LPG as a fuel for a CI engine. (6)

(ii) Mention the merits and demerits of alcohol as fuel for CI engine. (10)

15. (a) (i) Describe the functioning of a hybrid electric vehicle with a schematic. (10)

(ii) What are NOx adsorbers? Briefly discuss about its characteristics. (6)

Or

(b) (i) Describe the operation of a common rail direct injection system with an illustration. (10)

(ii) What is on Board Diagnostics? Discuss its functioning with a schematic. (6)

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