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

Question Paper Code : 53293

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Eighth Semester

Mechanical Engineering

ME 6016 — ADVANCED I.C. ENGINES

(Regulation 2013)

(Common to PTME 6016 – Advanced IC Engineering for B.E. Part-Time for Seventh Semester – Mechanical Engineering – Regulation 2014)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. With pressure-crank angle diagram mark the normal and abnormal combustion process.

2. Draw any two types of SI combustion chamber write its any two special features.

3. Define the term compression ignition and state how it differs from spark ignition.

4. Mark the stages of combustion of CI engine on heat release rate diagram.

5. State the reason for formation of carbon monoxide during combustion.

6. Draw the Indian driving cycle.

7. Define the term Biodiesel and write the name of the process through which Biodiesel is produced.

8. Ethanol or Methanol which is better for IC engine?

9. Why CRDI system is more flexible than mechanical fuel injection system?

10. State the need of hybrid electric vehicles.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the various stages of combustion in SI engine with pressure-crank angle diagram.

Or

(b) Discuss about the function and requirements of SI engine combustion chamber and explain the different types of combustion chambers used in SI engine with neat sketch.

12. (a) Explain the occurrence of knocking in CI engine and the factors that are influencing CI engine knock.

Or

(b) Discuss the methods of improving volumetric efficiency in CI engine and explain how turbocharging improves volumetric efficiency and methods of turbocharging.

13. (a) Explain the construction and working of three-way-Catalytic converter with neat sketch.

Or

(b) Describe the formation of oxides of nitrogen and particulates and explain the NOx-PM trade-off in diesel engine.

14. (a) Show the modifications required to use hydrogen as a fuel in SI engine, state the functions of each modification and benefits of hydrogen over gasoline fuel.

Or

(b) Present an overall comparative discussion about alternative fuels interms of its usage, benefits, sustainability, modifications and performance.

15. (a) Explain the working of common rail direct injection system with neat sketch and compare with mechanical fuel injection system.

Or

(b) Explain the fundamental differences in combustion principle between CI and HCCI combustion and how HCCI method breaks the NOx-PM trade-Off?

PART C — (1 × 15 = 15 marks)

16. (a) Discuss in detail about the promises and challenges exist in biodiesel production, sustainability and utilisation in IC engines.

Or

(b) Present a discussion about the evolution or development pathway of SI engine.

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