

Reg. No. : V E E R A P A N D I A N

Question Paper Code : 60841

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh/Eighth Semester

Mechanical Engineering

ME 2041/10122 MEE 53/ME 807 — ADVANCED I.C. ENGINES

(Regulations 2008/2010)

(Common to 10122 MEE 53 – Advanced I.C. Engines for B.E. (Part-Time)
Seventh Semester – Mechanical Engineering – Regulations 2010)

Time : Three hours

Maximum : 100 marks

Use of approved thermodynamic tables and charts are permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are different air-fuel mixtures on which an engine can be operated?
2. What are the factors that influence the flame speed?
3. Define cetane number scale.
4. What are the advantages of turbo charging?
5. What is the difference between smoke and particulate emissions?
6. How does a three way catalytic converter differ in operation compared with two way converter?
7. What is trans-esterification? List down any two vegetable oils.
8. Give the composition of LPG and CNG.
9. What is the working principle of prechamber stratified charge engine?
10. Mention the advantages of plasma ignition system.

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail how the fuel jet size and venturi size of the carburetor are decided for an automotive engine.

Or

- (b) Using pressure crank angle diagram ($p - \theta$) explain the different stages of normal (desirable) combustion in a SI engine. Also explain how abnormal combustion takes place using the same $p - \Theta$ diagram.
12. (a) With the aid of a schematic diagram, explain the combustion process in a C.I engine.

Or

- (b) Explain the factors affecting the delay period in C.I engines and summarize them.
13. (a) (i) Discuss briefly the HC, CO and NO pollutant formation mechanisms in a SI engine. (8)
- (ii) With a simple sketch, explain briefly the working principle of a particulate trap. (8)

Or

- (b) What are the various types of instruments used for the measurement of emissions from IC engines? With a schematic diagram, describe in detail the chemiluminescence method of measuring oxides of nitrogen.
14. (a) Explain the fuel characteristics of Alcohols, CNG, LPG and Hydrogen. (16)

Or

- (b) Explain the Performance Combustion and Emission characteristics of CI engine using Bio-diesel as a fuel. (16)
15. (a) (i) What is a surface ignition engine? Explain its advantages and disadvantages. (8)
- (ii) With a neat sketch explain the operation of a stratified charge engine. (8)

Or

- (b) (i) Explain the characteristics of a common rail direct injection diesel engine. (8)
- (ii) Discuss the method of obtaining pressure crank angle diagram. List down the parameters that can be studied from the pressure crank angle diagram. (8)