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Question Paper Code : X 60835

B.E./B.Tech. DEGREE EXAMINATIONS, NOV./DEC. 2020

Eighth Semester

Mechanical Engineering

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

(Common to PTME 2041 – Advanced I.C. Engines for B.E.

(Part-Time) Mechanical Engineering – Seventh Semester – Regulations 2009)

(Regulations 2008/2010)

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. List the different Air-Fuel ratios required for different operating conditions of a gasoline engine.
2. State any four important types (shapes) of combustion chambers common in SI engines.
3. State the purpose of turbocharger in automotive engines.
4. What do you understand by indirect injection systems ?
5. What is a three way catalytic converter ? Give the catalysts used in it.
6. What are emission norms ? Give the major pollutants that are to be controlled.
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) i) Discuss the air fuel ratio requirements of a S.I. engine. (8)
ii) Describe the various stages of combustion in a S.I. engine with a p- θ diagram. (8)
(OR)
- b) i) Explain the various factors that affect knock in a S.I. engine. (8)
ii) Discuss the different types of combustion chambers employed in a S.I. engines. (8)
12. a) i) List the factors which affect knock in a CI engine and explain their influence in detail. (8)
ii) Give any four differences between direct and indirect injection engines. (8)
(OR)
- b) i) Explain the advantage of turbo charging in CI engines. Also sketch any four types of turbo chargers used and explain the arrangement. (8)
ii) Briefly explain the thermodynamic analysis of CI engine combustion process. Explain clearly the assumptions made. (8)
13. a) What is smoke and explain the principle used in the measurement of smoke ? (16)
(OR)
- b) Explain the internationally accepted methods of measuring the following invisible emission.
i) Oxides of Nitrogen (6)
ii) Carbon monoxide (6)
iii) Aldehydes. (4)
14. a) Give a table describing in detail the comparison between alcohol, hydrogen natural gas, LPG and vegetable oils for their suitability as IC engine fuel. Consider all important factors pertinent to engine combustion.
(OR)
- b) What are the major engine modifications needed when unconventional fuels or their blends are used in conventional diesel Powered CI engine ? Explain in detail.
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)