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Question Paper Code : 21555

B.E./B.Tech. DEGREE EXAMINATION , MAY/JUNE 2013

Eighth Semester

Mechanical Engineering

ME 2041/ME 807 – ADVANCED I.C. ENGINES

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions

PART A – (10 X 2 = 20 marks)

1. What is a heterogeneous air-fuel mixture? In which engine is it used?

2. Sketch T-Head type combustion chamber used in S.I engines.

3. Mention any two advantages of induction swirl.

4. What is an indirect-injection type combustion chamber.

5. Why smoke is formed in a CI engine?

6. State the significance of stoichiometric air-fuel mixture.

7. State the methods by which ethanol is produced.

8. Comment on the water tolerance of alcohol blends.

9. What is the working principle of prechamber stratified charge engine?

10. Mention the advantages of plasma ignition system.

PART B – (5 X 16 = 80 marks)

11. (a) (i) Explain the stages of combustion in SI engines elaborating the flame front propagation. (10)

(ii) Explain briefly the various factors that influence the flame speed in S.I. engines. (6)

Or

(b) Describe the requirements of an S.I engine combustion chamber and explain the various types of combustion chamber.

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) Specify the main emissions from a multi-cylinder passenger car C.I engine. How is the air-fuel ratio controlled so as to reduce emissions? (10)

(ii) What is a driving cycle? Discuss its significance with regard to emissions. (6)

Or

(b) (i) Explain the functioning of three way catalytic converter , with a sketch. Mention the limitations of a catalytic converter. (12)

(ii) What are the methods to reduce particulate matter emissions?

14. (a) Compare the properties of gasoline , methanol and ethanol as engine fuels and explain how they influence combustion and emissions?

Or

(b) Discuss the change in properties of alcohol-petrol blends and their effect on the performance of the engine.

15. (a) (i) Describe with a sketches how a CI engine can be controlled electronically. (12)

(ii) What is stratified charge? Give its significance. (4)

Or

(b) (i) Describe the features of homogenous charge compression ignition engine and common rail direct injection engine with neat sketches. (6 + 6)

(ii) Briefly discuss about the necessity of pressure pick , charge amplifier in an IC engine. (4)