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12MTP253

**Second Semester M.Tech. Degree Examination, June / July 2014**  
**Alternative Fuels for IC Engines**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1
  - a. Describe basic properties of petroleum fuels and briefly explain the chemical structure of petroleum. (10 Marks)
  - b. Explain knock rating of SI engine fuels. What do you understand by ignition quality? (10 Marks)
- 2
  - a. Explain in brief, i) HUCR ii) Octane number iii) Aniline point iv) Smoke point and Char point v) Distillation range vi) Performance number. (12 Marks)
  - b. How are SI and CI engines fuels rated? (04 Marks)
  - c. Explain brief: i) Oxidation stability ii) Emulsification (04 Marks)
- 3
  - a. Explain any one method of manufacturing the following alternative fuels:  
i) Methanol ii) Producer gas (12 Marks)
  - b. Explain Bio-gas as alternate fuel for IC engines. (08 Marks)
- 4
  - a. What are the advantages and limitations of LPG as a SI engine fuel? (10 Marks)
  - b. Explain the performance of IC engine using H<sub>2</sub> as fuel. (05 Marks)
  - c. What are the factors affecting the formation of biogas? (05 Marks)
- 5
  - a. With a neat sketch, explain the working of dual-fuel engine. (10 Marks)
  - b. Explain the factor affecting combustion in a dual-fuel engine. Also compare the performance of dual-fuel engine with petrol and diesel engine. (10 Marks)
- 6
  - a. What is transesterification? What are the advantages and disadvantages of bio-diesel? (10 Marks)
  - b. Explain the performances and emission characteristic of any two vegetable oil with a neat sketch. (10 Marks)
- 7
  - a. Discuss the availability and future prospectess of LPG and CNG as fuels in India. (10 Marks)
  - b. Why hydrogen is considered as most favourable substitute fuel for future? (07 Marks)
  - c. What is the cause for formation of N<sub>OX</sub>? (03 Marks)
- 8
 

Write a short notes on any four:

  - a. Catalytic converters.
  - b. Effects of different polutants on human life.
  - c. Thermal reactor packages.
  - d. EGR (Exhaust Gas Recirculation) system.
  - e. Exhaust gas ignition system. (20 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.