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14MTP252

Second Semester M.Tech Degree Examination, June/July 2015
Alternate Fuels for IC Engines

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. Describe the basic properties of petroleum fuels and briefly explain the chemical structure of petroleum. (10 Marks)
b. What are the requirements of an Ideal gasoline? Mention the desirable characteristics of diesel fuels. (10 Marks)
- 2 a. Explain in brief the following properties of petroleum : i) Cloud point and pour point ii) Smoke point and char value iii) Diesel Index iv) Performance Number v) Octane Number. (10 Marks)
b. Explain in brief: i) Emulsification ii) Oxidation stability iii) Gum content of petroleum fuels iv) Sulphur content v) Acid value/Number. (10 Marks)
- 3 a. Explain any one method of manufacturing the following alternate fuels :
i) Methanol ii) Producer gas. (10 Marks)
b. Give a brief account of LPG being used as an alternate fuel in SI engine. What are the advantages of LPG? (10 Marks)
- 4 a. Why H₂ is considered most favourable substitute fuel for future? (10 Marks)
b. What modifications are required with engine using LPG as a substitute fuel? (10 Marks)
- 5 a. With a neat sketch, explain the working of dual fuel engine. (10 Marks)
b. Explain the factors affecting combustion in dual fuel engine. Also compare the performance of dual fuel engine with petrol and diesel. (10 Marks)
- 6 a. What is Transesterification? What are the advantages and disadvantages of bio – diesel? (10 Marks)
b. Explain the performance and emission characteristic of any two vegetable oil, with neat sketch. (10 Marks)
- 7 a. What are the causes for formation of N_{ox} in S.I. engine? Explain briefly the different methods to reduce N_{ox}. (10 Marks)
b. Describe with neat sketches, the following methods used to control emission in S.I. engine :
i) After burner ii) Exhaust manifold reactor. (10 Marks)
- 8 a. Discuss the availability and future prospectus of LPG and CNG as fuels in India. (10 Marks)
b. Write a short notes on :
i) Catalytic converters ii) Euro norms I & II. (10 Marks)

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.