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10MTP253

Second Semester M.Tech. Degree Examination, June 2012
Alternative 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 explain their relationship with the molecular structure of hydrocarbons. **(10 Marks)**

b. Discuss the effect of volatility on
i) Starting; ii) Warm up; iii) Acceleration; iv) Short and long trip economy; v) Carburetor icing. **(10 Marks)**

2 a. Explain in brief: i) HUCR; ii) Performance number; iii) Emulsification; iv) Oxidation stability. **(08 Marks)**

b. What is meant by octane number, cetane number, acid value and aniline point of a fuel? **(08 Marks)**

c. Can petrol be used as a diesel engine fuel? Discuss. **(04 Marks)**

3 a. Explain any one method of manufacturing of the following alternative fuels: i) Ethanol; ii) Biogas. **(10 Marks)**

b. Discuss the use of LPG as a substitute fuel and what are the advantages and disadvantages of LPG when used as an alternative fuel for IC engines. **(10 Marks)**

4 a. What are the advantages and disadvantages of hydrogen when used as a substitute fuel for IC engines? **(10 Marks)**

b. Explain how the engines using pure alcohol fuels perform as compared to engines using petrol. **(10 Marks)**

5 a. Discuss briefly the factors affecting combustion in a dual-fuel engine. **(12 Marks)**

b. Explain the performance and engine modifications required when biogas is used in CI engines in dual-fuel mode. **(08 Marks)**

6 a. What is transesterification? What parameters effect the effectiveness of transesterification process. **(10 Marks)**

b. Compare the properties of biodiesel with petrodiesel and its effect on the performance of engine. **(10 Marks)**

7 a. Discuss the availability and future prospects of LPG and CNG as fuels in India. **(08 Marks)**

b. Why hydrogen is considered as most favourable substitute fuel for future? **(08 Marks)**

c. Compare diesel engine and gasoline engine emissions. **(04 Marks)**

8 a. What is the cause for formation of NO_x? Explain briefly the different methods to reduce NO_x. **(10 Marks)**

b. With a neat sketch explain:
i) Thermal reactor package.
ii) Catalytic converter package. **(10 Marks)**

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