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12MTP253

Second Semester M.Tech. Degree Examination, June/July 2013
Alternate Fuels for IC Engines

Time: 3 hrs. Max. Marks:100

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

1 a. Explain the petroleum refining process with the help of a neat schematic diagram and list the important products of refining process. **(10 Marks)**

b. Explain the effect of stability, fluidity and ignition quality of diesel on the performance of C.I. engine. **(10 Marks)**

2 a. Explain in brief the following properties of petroleum:
i) Pour point
ii) Cloud point
iii) Performance number
iv) Octane number
v) HUCR. **(10 Marks)**

b. Discuss the importance of
i) API gravity
ii) Gum content
iii) Heat of combustion
iv) Sulphur content for a diesel fuel
v) Cetane number. **(10 Marks)**

3 Explain any one method of manufacturing of the following alternative fuels:
i) Ethanol; ii) Hydrogen; iii) Biogas; iv) Producer gas. **(20 Marks)**

4 a. What are the basic modifications required for an engine to use alternative fuels. **(06 Marks)**

b. How the emission characteristics can be measured? Name some of the instruments used to measure emissions. **(08 Marks)**

c. What is catalytic converter? Why it is used? **(06 Marks)**

5 a. Giving reasons explain whether CO and NO emissions increase OR decrease when the following variables are increased: i) Fuel air ratio; ii) Compression ratio; iii) Engine speed; iv) Surface to volume ratio; v) Spark advance. **(10 Marks)**

b. Discuss in brief the factors affecting combustion in a dual-fuel engine. **(10 Marks)**

6 a. Explain the performance and emission of CI engine using alcohols. **(10 Marks)**

b. Describe in brief the production of biodiesel through transestrification process. **(10 Marks)**

7 a. What are the causes for formation of N_{OX} in S.I. engine? Briefly explain the different methods to reduce N_{OX}. **(10 Marks)**

b. Compare the performance and emission characteristics of bio-diesel versus petro diesel operation. **(10 Marks)**

8 a. Compare the performance of a S.I. engine operated on CNG and gasoline. **(10 Marks)**

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

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