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Roll No .....

MEEM - 203

M.E./M.Tech., II Semester

Examination, June 2014

Fuel Technology and Air Pollution

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.

ii) All questions carry equal marks. draw neat sketch and assume suitable data wherever you required.

1. a) Explain what do you mean by banded coals. What are the undesirable features of ash in coal?
   b) How is the proximate analysis of a coal conducted and what is its significance in determining the utility of a coal for a particular purpose.

2. a) Explain the effect of temperature of carbonization on the quality of products formed during carbonization of coal. Also discuss the various zones of gasification along with temperature and its significance?
   b) Explain the following with respect to the requirements of a good metallurgical coke.
      i) Porosity ii) Calorific value
      iii) Combustibility iv) Strength
      v) Reactivity

3. a) What are the key issues and challenges for refineries in India? Discuss the need of refining the crude oil with suitable examples.
   b) What is isomerization and what for it is used? Explain how isomerization is similar or dissimilar to cracking reforming.

4. a) What is Octane Number and Cetane Number? D the tests and properties of diesel.
   b) With the help of neat sketch and necessary chen reactions, explain the manufacture of coke oven g Explain the treatment that the coke oven gas is subjecte to recover the by products before it is used as a fuel gas.

5. a) Write the technical definition for Biodiesel (ASTM D 6751) and Biodiesel blend. Explain the three basic routes to ester production from oils and fats.
   b) Describe in brief about the Indian sugar mills are rapidly turning to bagasse, the leftover of cane after it is crushed and its juice extracted, to generate electricity.

6. a) Explain how biogas technology provides an alternative source of energy in rural India for cooking.
   b) Describe the technological advancement in biomass energy and state the advantages of biomass energy as an alternative energy source.

7. a) What are the health consequences of air pollution? How is WHO confronting air pollution effects on health?
   b) Define EPA, Pollutant Standard Index, (PSI) and explain following air pollution sources classifications: stationary or mobile, combustion or non-combustion, point or area and natural sources.

8. a) Describe the use of air pollution control technology to satisfy the requirements of good engineering practice and developing a control technology to meet ambient air quality standards and other source related regulations.
   b) Discuss how the particulate matters are collected by a combination of several mechanisms gravitational settling, centrifugal impaction, inertial impaction, direct interception, diffusion and the electrostatic attraction.

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