Total number of printed pages – 2

B. Tech

PEMN 5301

Fifth Semester Examination – 2013

FUEL TECHNOLOGY

BRANCH : MME, MM

QUESTION CODE : C-369

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any five from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions :

2×10

   (a) What is fuel ? Differentiate between primary and secondary fuels with examples.

   (b) What do you mean by metamorphism ?

   (c) Define calorific value. Differentiate between net and gross calorific value.

   (d) What is swelling index ?

   (e) Draw the actual washability curve diagram.

   (f) What are the properties of charcoal ?

   (g) Describe briefly how solar energy is used in metallurgical industries.

   (h) Define renewable energy with example.

   (i) Name the factors affecting composition of coke oven gas.

   (j) What is Ferro coke ? How is it used in power industries ?

2. (a) Explain blast furnace gas. Describe its properties, characteristics and uses.

5

   (b) Differentiate between high temperature and low temperature carbonization of coal.

5

P.T.O.

3. (a) What is Tidal energy ? Explain how it is useful in metallurgical and power industries. 5

(b) Explain activated carbon and give its uses. 5

4. (a) Explain the principle of combustion of fuel. 5

(b) Explain solid energy waste and its industrial application. 5

5. (a) What is petroleum coke and how is it used in metallurgy ? 5

(b) Differentiate between renewable and non-renewable energy with examples. 5

6. (a) Briefly explain washability curve. 5

(b) The exhaust gas from a hydrocarbon fuel oil fired furnace shows 10.2% CO_2, 7.9% O_2 and 81.9% N_2 by Orsat analysis.

Calculate (i) Present excess air, (ii) kg of dry air supplied per kg of oil burning in the engine. 5

7. (a) What is producer gas ? Explain its properties and uses. 5

(b) Explain testing methods and properties of graphite. 5

8. (a) Determine the amount of air supplied when a medium fuel oil with 83.9% carbon, 12.4% H_2, 14.2% Sulphur, 0.4% O_2 and 0.2% ash by weight is burnt with 20% excess air. Assure complete combustion. 5

(b) Explain how charcoal is alternatively used as a source of energy in metallurgical and power industries. 5

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