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Total number of printed pages – 2

B. Tech
PECH 5303

Fifth Semester Regular Examination – 2014

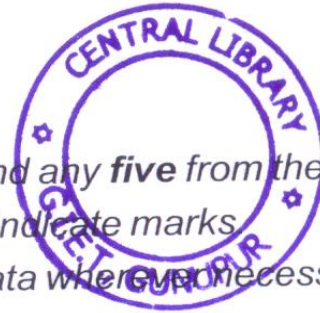
FUEL AND ENERGY TECHNOLOGY

BRANCH : CHEM

QUESTION CODE : H 186

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
Assume suitable notations and any missing data wherever necessary.

1. Answer the following questions :

2 × 10

- Differentiate between Gondwana and Tertiary coals.
- Briefly write about the types of losses of coal.
- In washability of coal, what are Cleans and Rejects ?
- Write the reactions involved in the Carbide theory of origin of crude oil.
- Mention the advantages of catalytic cracking over thermal cracking.
- Fluidized hydroformers operate at _____ °C and _____ kg/cm².
- In the production of water gas, what is done to avoid undesirable reactions ?
- What is the effect of blast-furnace gas on human health ?
- Write the operating conditions of Fischer-Tropsch reactors.
- What is the importance of multiplication factor (K) in nuclear reactors ?

2. (a) Discuss the steps to be taken to prevent the loss of coal.

4

(b) What do you understand by washability of coal ? Explain this with a graph.

1+5

P.T.O.

3. (a) Briefly discuss about the Beehive oven for the manufacture of metallurgical coke. 5
- (b) Briefly discuss about the properties of coke. 5
4. (a) Compare the thermal cracking reactions with catalytic cracking reactions. 6
- (b) Mention the chemical reactions in catalytic reforming. 4
5. Discuss the manufacturing process of producer gas giving emphasis on reactions and reaction zones in gas producer with a neat diagram of the gas producer. 10
6. Discuss the Lurgi gasification process with a neat sketch of the gasifier giving emphasis on the process variables. 10
7. A dry flue gas from a furnace has 12% CO₂, 6% O₂, and rest N₂ by Orsat analysis. Calculate the % excess air used and wt. of combustion air used per kg of oil fired. Assume fuel to have 80% C, 10 % H, 5% S and rest ash. MW of dry flue gas = 28. 10
8. Write short notes on any **two** : 5×2
- (a) Tar distillation
- (b) Factors affecting composition of coke oven gas
- (c) Properties of uranium
- (d) Pulverized coal firing system.