Paper Code: CH-062	**Roll No.**										

B. TECH.
SIXTH SEMESTER EXAMINATION, 2015-2016
ENERGY EFFICIENCY & CONSERVATION

Time: 3 Hours *Total Marks: 100*

Note: Attempt ***ALL*** questions. Assume suitable data, if required. All question carry equal marks.

1. Attempt any ***TWO*** parts of the following: - **(10x2)**

(a) How producer gas can be produced from coal? Also explain the major energy conservation steps in a dryer with suitable examples.

(b) How can solar power be integrated to reduce the demand of hydro- electricity on a large scale? Give suitable examples also.

(c) Write short notes on the following
(i) Grand composite curves (ii) Energy targets
(iii) *Economy* of an evaporator (iv) Process Utility

2. Attempt any ***TWO*** parts of the following: - **(10x2)**

(a) Describe the working of a gas turbine based cogeneration systems with suitable examples.

(b) Discuss the term 'Audit'. What are the objectives of 'Energy Audit'? Discuss the procedure of energy audit for a chemical process plant.

(c) Discuss the importance of *Demand* and *Supply* of energy in Indian context. Also give the role of 'steam jet ejectors' in the conservation of energy.

3. Attempt any ***TWO*** parts of the following: - **(10x2)**

(a) Give a suitable neat sketch of an absorption column along with the input energy streams. Explain the major energy conservation steps in an absorption column with suitable examples.

(b) Describe the principles of pinch analysis for heat integration in chemical process industries. Also give the applications of pinch analysis.

(c) What is the role of Bureau of Energy Efficiency? Characterize the term 'Cogeneration'. Discuss the worth of cogeneration in the operation of a typical chemical plant.

4. Attempt any ***TWO*** parts of the following: - **(10x2)**

   (a) Define the term 'Efficiency' with the help of a suitable example. How will you enhance the energy efficiency of a Fired-heater in a process plant?

   (b) How will you recover 'waste heat' in a process plant? Explain the relationship between energy conservation and cost-benefit in a chemical plant.

   (c) Describe the insulating properties of materials with their applications. How will you optimize insulation thickness? Establish yourself with suitable examples.

5. Attempt any ***TWO*** parts of the following: - **(10x2)**

   (a) What do you understand with the Efficiency of a steam power plant? Also explain the first law of thermodynamics with the help of a suitable example.

   (b) Give the various Renewable and non-Renewable sources of energy. Also discuss the Energy conservation bill 2001.

   (c) Enumerate the different sources of energy input to a distillation column. Discuss the various methods which can be employed for energy conservation in the distillation column.