

**IV B.Tech I Semester Supplementary Examinations, April/May 2005**  
**POWER SYSTEM OPERATION & CONTROL**  
**(Electrical & Electronic Engineering)**

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
All Questions carry equal marks

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1. Explain in detail the terms production costs, total efficiency, incremental efficiency and incremental rates with respect to Thermal power plant.
2. (a) Incremental fuel cost in Rupees per megawatt hour for two units comprising a plant are given by the following equations:  
$$\frac{dc_1}{dp_1} = 0.010p_1 + 20$$
$$\frac{dc_2}{dp_2} = 0.012p_2 + 1.6$$
Assume that both units are operating at all times, that total load varies from 50 to 250 MW, and the maximum and minimum loads on each unit are to be 125 and 20 MW respectively. Find the incremental fuel cost and the allocation of loads between units for the minimum cost of various total loads.  
(b) Give step-by-step procedure for computing economic allocation of generation in a thermal station.
3. Discuss the Dynamic programming method to solve Unit commitment problem in power systems.
4. Explain optimal load flow solution without inequality constraints.
5. Obtain the dynamic response of load frequency controller with and without integral control action.
6. Two power systems A & B are inter connected by a tie line and have power frequency constants  $K_A$  and  $K_B$  per Hz. An increase in load of 500 MW on system 'A' causes a power transfer of 300 MW from 'B' to 'A'. When the tie line is opened the frequency of system 'A' is 49 HZ and of system 'B' 50 Hz. Determine the values of  $K_A$  and  $K_B$ , deriving any formulae used.
7. (a) Explain about the losses occurred due to VAR flow in power systems.  
(b) Explain how the generators are acted as VAR sources in a power network
8. What is load compensation? Discuss its objectives in power system.

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