

Code :R7410204

R7

IV B.Tech I Semester (R07) Supplementary Examinations, May 2011
POWER SYSTEM OPERATION & CONTROL
(Electrical & Electronics Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

1. (a) Explain the various factors to be considered in allotting generation to different power stations for optimal operation.
 (b) The fuel inputs per hour of plants 1 and 2 are given as

$$F_1 = 0.2P_1^2 + 40P_1 + 120 \text{ Rs/hr}$$

$$F_2 = 0.25P_2^2 + 30P_2 + 150 \text{ Rs/hr}$$
 Determine the economic operation schedule and the corresponding cost of generation if the maximum and minimum loading on each unit in 100 MW and 25MW, the demand is 180MW and transmission losses are neglected. If the load is equally shared by both the units, determine the saving obtained by loading the units as per equal incremental production cost.
2. (a) What is the assumption made in deriving the transmission loss - coefficients?
 (b) Write an algorithm for economic allocation of generation among generators of a thermal system taking into account transmission losses with deriving necessary equations.
3. Explain hydro thermal economic load scheduling. Derive the necessary equations.
4. (a) Derive the model of a generator and represent it by a block diagram.
 (b) Two turbo alternators rated 110MW and 210MW have governor droop characteristics of 5% from no load to full load. They are connected in parallel to share a load of 250MW. Determine the load shared by each machine assuming free governor operation.
5. (a) Explain the reasons for limitation of frequency on the power systems.
 (b) With first order approximation, obtain the dynamic response of isolated power system for load frequency control.
6. Give a typical block diagram of two - area system interconnected by a tie line and explain each block. Also deduce the relation to determine the frequency of oscillations of Tie line power and static frequency drop. List out assumptions made.
7. (a) Explain proportional plus integral control of single area system with neat block diagram and derive necessary equations.
 (b) Two generators rates 200MW and 400MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively from no load to full load. Assuming that the generators are operating at 50Hz at no load, how would a load of 600MW be shared between them? What will be the system frequency at this load? Assume free governor operation.
8. (a) Discuss in detail about the generation and absorption of reactive power in power system components.
 (b) What is load compensation? What are the objectives of load compensation?
