Code No: 57015

Time: 3 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks
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1.a) Explain about heat rate, cost and incremental cost curves of a thermal power station.

b) A constant load of 300MW is supplied by two 200 MW generators, with the incremental fuel costs are

$$\frac{dC_1}{dP_{G1}} = 0.1P_{G1} + 20 \quad Rs/Mwh.$$

$$\frac{dC_2}{dP_{G2}} = 0.12P_{G2} + 15 \; Rs/Mwh.$$

with P_G in MW and costs C in Rs/h. Determine the most economical division of load between the generators. [7+8]

2.a) Derive the necessary conditions for optimal load scheduling with network losses considered.

b) Briefly explain the interactive steps involved in solving the coordination equations. [7+8]

3. Explain in detail about short term hydro-thermal scheduling problem and its solution technique. [15]

4.a) Briefly explain about automatic generation control and its necessity?

b) Derive the approximate linear models for governor, turbine and generator local systems. Draw their respective block diagrams. [7+8]

5.a) What is a control area? Draw the block diagram of an isolate single area load frequency control system.

b) Obtain the steady state and dynamic response of single area LFC system (uncontrolled). [8+7]

6. Prove that the steady state derivation in system frequency for a step change in load demand is smaller in case of two area load frequency controlled system as compared to that of single area load frequency controlled systems. [15]

7.a) Briefly explain about the relation between load frequency control and economic dispatch control problem.

b) Give the necessity of proportional plus integral control of single area load frequency control systems. Mention the designed featured of the feedback control loop and compare its steady state and dynamic response with that of uncontrolled case. [7+8]

8.a) Briefly give an overview of reactive power control in power systems.

b) Distinguish between line and load compensation.