Code No: **RT41023** **R13** **Set No. 1**

IV B.Tech I Semester Supplementry Examinations, March - 2021

POWER SYSTEM OPERATION AND CONTROL

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) Explain how the incremental production cost of a thermal power station can be determined. [3]
   b) Describe the objective function in minimize the cost of generation of hydro thermal scheduling. [3]
   c) Compose the priority list for method of solving unit commitment Problem. [4]
   d) Formulate and draw the dynamic responses of change in frequency for a step load change for single area system. [4]
   e) Write the significance of load frequency control and economic dispatch control. [4]
   f) Briefly discuss about FACTS controllers. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain equal incremental cost criterion for economic generation scheduling. Also write the algorithm for the iterative method for obtaining economic loading of generators. Neglect transmission losses. [8]
   b) A simple two plant system have the incremental cost curves are

$$\frac{dC_1}{dP_{G1}} = 0.01P_{G1} + 2.0 \quad ; \quad \frac{dC_2}{dP_{G2}} = 0.01P_{G2} + 1.5 .$$

   Determine P_{G1} and P_{G2} when the load on the system is 1000 MW [8]

3. a) Derive the co-ordination equation for the optimal scheduling of Hydro – Thermal interconnected power systems. [8]
   b) Explain the problem of short term Hydro-thermal scheduling. [8]

4. a) Explain the problems and constraints found in unit commitment. How they are solved. [8]
   b) Explain the solution technology for solving priority list method by dynamic programming method. [8]

5. a) What are the components of speed governor system of an alternator and Derive its transfer function with an aid of a block diagram. [8]
   b) Derive the transfer function model and draw the block diagram for single control area provided with governor system. [8]

6. a) Obtain the dynamic response of load frequency controller with integral control action in single area load frequency control system. [8]
   b) Obtain an expression for steady state response of a load frequency controller with integral control. How it is different from without integral control. [8]

7. a) Explain the Static shunt capacitor Compensator and Static series capacitor Compensator for System Control. [8]
   b) Write the specifications of load compensator. [8]