

Code No: RT41023

R13**Set No. 1****IV B.Tech I Semester Supplementary Examinations, March - 2017****POWER SYSTEMS OPERATION & 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************PART-A (22 Marks)**

1. a) Explain Generation cost and Production cost of thermal power station. [3]
- b) Distinguish between long term and short term hydro- thermal scheduling. [4]
- c) Explain the significance of Unit Commitment. [4]
- d) Briefly discuss single area load frequency control and two area load frequency control. [4]
- e) Explain dynamic response of load frequency controller with integral control action in two area load frequency control system. [4]
- f) Explain need for FACTS devices. [3]

PART-B (3x16 = 48 Marks)

2. a) Explain the following terms with reference to power plants:
Heat input – power output curve, Heat rate input, Incremental input. [8]
- b) Explain the various factors to be considered in allocating generation to different power stations for optimum operation. [8]
3. Describe different methods for solving hydro thermal optimal scheduling. [16]
4. a) What do you mean by unit commitment problem and discuss various constraints related to UCP. [8]
- b) Discuss in detail, the dynamic programming approach for the solution of UCP. [8]

Code No: **RT41023**

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5. a) Derive the model of a speed governing system and represent it by a block diagram. [8]
- b) A 80 MVA synchronous generator operates on full load at a frequency of 50Hz. The load is suddenly reduced to 40 MW. Due to time lag in the governor system, the steam valve begins to close after 0.3 secs. Determine the change in frequency that occurs in this time. $H=4$ KW-s/KVA of generator capacity. [8]
6. a) What are the basic requirements needed for control strategy in LFC system. [8]
- b) A single area consists of two generators with the following parameters:
Generator 1 = 1200 MVA; $R=6\%$ (on machine base)
Generator 2 = 1000 MVA; $R=4\%$ (on machine base)
The units are sharing 1800 MW at normal frequency 50 Hz. Unit supplies 1000 MW and unit 2 supplies 800 MW. The load now increased by 200 MW.
i) Find steady state frequency and generation of each unit if $B=0$.
ii) Find steady state frequency and generation of each unit if $B=1.5$. [8]
7. a) Briefly explain advantages and disadvantages of different types of compensating equipment for transmission system. [8]
- b) Describe the features of load compensator and its specifications. [8]