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

IV B.Tech I Semester Supplementary Examinations, October/November-2019
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) Distinguish between incremental fuel rate and heat rate.   [4]
    b) Compare short term and long term hydro-thermal scheduling.   [3]
    c) What is spinning reverse?   [3]
    d) Explain the significance of area control error.   [4]
    e) List the merits of PI controller in load frequency control.   [4]
    f) Write an expression for voltage drop in terms of reactive power, line reactance and voltage.   [4]

PART–B *(3x16 = 48 Marks)*

2. a) Derive the equation for optimal load sharing among n units in a power system by neglecting transmission losses.   [8]
    b) A constant 30MW supplied by two 150MW generators, 1 and 2 for which the respective incremental fuel costs are $dC_1/dP_1=0.1P_1+20$, $dC_2/dP_2=0.2P_2+25$. With P in MW and C in Rs/h. Determine   (i) the most economical division of load between the generators (ii) the saving in Rs/day there by obtain compared to equal load sharing between the machines.   [8]

3. a) Mention the merits of operating hydro-thermal combinations.   [8]
    b) Derive the coordination equation for the optimal scheduling of hydrothermal interconnected power plants.   [8]

4. a) Explain the problem of unit commitment. Discuss the constraints in solving the unit commitment problem.   [8]
    b) What is priority list method of unit commitment? Explain it with an example. [8]

5. a) Explain the concept of control area. Develop a state space representation of two area control system.   [8]
    b) Draw a neat sketch of a typical turbine speed-governing system and derive its block diagram representation.   [8]

6. a) Describe the combined operation of an load frequency control and economical dispatch control, with the help of block diagram.   [8]
    b) Discuss about the basic requirements needed for control strategy in load frequency control.   [8]

7. a) Briefly explain the different methods of reactive power injection in the power system.   [8]
    b) With the help of block diagram explain the reactive power balance and its effects on system voltage.   [8]