R16

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022
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 FOUR questions from Part-B
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PART–A *(14 Marks)*

1. a) Deduce the formula for the reserve capacity of a plant?   [3]
    b) Write briefly about the classification of hydro thermal coordination?   [3]
    c) Write short notes on minimum up-time?   [2]
    d) How the frequency variation will affects the operation of electrical clocks?   [2]
    e) What is meant by an optimal linear regulator?   [2]
    f) Write short notes on the load balancing?   [2]

PART–B *(4x14 = 56 Marks)*

2. a) Explain in detail about the output constraints and voltage-delta constraints of   [7]
        optimized economic generation by neglecting the transmission losses?
    b) The fuel cost of two units are given as   [7]
        $C_1 = C_1(P_{G1}) = 1.2 + 25 P_{G1} + 0.4 P_{G1}^2$ Rs./Hr
        $C_2 = C_2(P_{G2}) = 1.7 + 45 P_{G2} + 0.6 P_{G2}^2$ Rs./Hr
        If the total demand on the generators is 220MW, find the economic load
        scheduling of the two units?

3. a) Write the advantages of operation of hydro thermal combinations?   [7]
    b) Derive the solution of short term hydro thermal scheduling by penalty factor   [7]
        method?

4. a) Deduce the cost function formulation by shunt down cost consideration?   [7]
    b) Explain about the spinning reserve constraint in the unit commitment problem?   [7]

5. a) Analyze the un stable conditions of real power and frequency relations?   [7]
    b) Explain the proportional and integral control of load frequency control of a single [7]
        area system?

6. a) Analyze the static response of a two area power system with un controlled case?   [7]
    b) Analyze the dynamic response of a two area power system with controlled case?   [7]

7. a) Draw and explain the circuit model and phasor diagram of compensated system?   [7]
    b) A three phase, 50Hz, 35km transmission line supplies a load of 5.8MW at 0.6   [7]
        power factor lagging to the receiving end where the voltage is maintained at
        constant of 11kV. The line resistance and inductance are 0.04 ohms and 0.76mH
        per phase per kilo meter respectively. A capacitor is connected actross the load to
        raise the power factor to 0.95 lagging. Find the value of capacitance per phase
        and the voltage regulation?

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