PVP 12

Code: EE7T1

IV B.Tech - I Semester – Regular Examinations November 2015

POWER SYSTEM OPERATION & CONTROL
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

Answer any FIVE questions. All questions carry equal marks

1 a) Obtain the condition for optimum operation of a power system with 'n' plants by neglecting losses. 6 M

b) A system consisting of two plants connected by a tie line and load is located at plant-2 When 100MW is transmitted from plant-1, a loss of 10MW takes place on the tie line. Determine the generation schedule at both the plants and the power received by load when λ of the system is 25Rs/MWh and IFC are given by 8 M

$$\frac{dc_1}{dp_1} = 0.03p_1 + 17Rs/MWh, \qquad \frac{dc_2}{dp_2} = 0.06p_2 + 179Rs/MWh,$$

2 a) What are the advantages of operation hydro thermal Combination? 6 M

b) A two plant system that has a thermal station near the load center and a hydro power station at a remote location. The characteristics of both stations are

$C_1 = (26+0.045P_{GT})P_{GT}$ Rs/hr

$W_2 = (7+0.004P_{GH})P_{GH}$ m^3/s and $\gamma_2 = Rs\ 4 \times 10^{-4}/m^3$

The transmission loss co-efficient, B_{22}=0.0025/MW. Determine the power generation at each station and power received by the load when λ=65Rs/MWh. 8 M

3 a) Explain the state space model of a synchronous machine. 8 M

b) Explain the different types of turbines with neat diagrams. 6 M

4 a) Explain difference between speed governor for a Hydraulic turbine and governor for a steam turbine. 6 M

b) Draw the block diagram of IEEE model for excitation control and explain the same. 8 M

5 a) Explain why it is necessary to maintain the frequency of the system constant. 4 M

b) An isolated generator and its control have the following parameters: 10 M

i) Generator inertia constant=5 seconds

ii) Governor time constant τ_g=0.25 seconds

iii) Turbine time constant τ_t =0.6 seconds

iv) Governor speed regulation=0.05 p.u

v) Load damping constant B=0.8

The turbine rated output is 200 MW at 50 Hz. The load suddenly increases by 50 MW. Find the steady state

frequency deviation. Plot the frequency deviation as a function of time.

6 a) Explain how the tie-line power deviation can be incorporated in two-area system with block diagram. 8 M

b) Explain the combined operation of Load Frequency Control and Economic Dispatch Control system. 6 M

7 a) Explain the effects on uncompensated line under no load and load conditions. 6 M

b) A 3-Phase, 50 Hz, 3000 V motor develops 700 HP, the p.f being 0.8 lagging and the efficiency 0.9. A bank of capacitors is connected in delta across the supply terminals and the p.f raised to 0.95 lagging. Each of the capacitance units is built of five similar 600 V capacitors. Determine capacitance of each capacitor. 8 M

8 a) Explain the incremental cost of generation. 7 M

b) Explain the need of deregulation of power system and explain the conditions of deregulation. 7 M