PVP 17

Code: 17**EEPC2T2**

I M.Tech - II Semester – Regular/Supplementary Examinations
July 2019

ECONOMIC OPERATION OF POWER SYSTEMS
(POWER SYSTEM & CONTROL)

Duration: 3 hours Max Marks: 60

Answer the following questions.

1. A two-plant system that has thermal station near the load centre and hydro 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/sec
   and $\gamma_2 = \text{Rs. } 4 \text{ X } 10^{-4}\ /m^3$
   transmission loss coefficient, B_{22}=0.0025MW^{-1}
   Calculate the power generation at each station and power received by load when λ = 65 Rs/Mwh. 15 M

(OR)

2. a) Obtain the condition for generation scheduling for economic dispatch when transmission losses are considered in thermal system. 8 M

   b) Draw the heat rate curve and cost curve and explain the significance of each curve. 7 M

3. a) Write short notes on base point and participation factors. 7 M

b) The fuel input per hour of plant 1 and 2 are given as

$C_1=0.2P_1^2+40P_1+120$ Rupees/hour

$C_2=0.25\ P_2^2+30\ P_2+150$ Rupees/hour

Find the economic operating schedule and the corresponding cost of generation if the max and min loading of each unit is 100MW and 25MW, the demand is 180MW and the transmission loss neglected. If the load is equally shared by both the units, calculate the saving obtained by loading the units as per equal incremental production cost. 8 M

(OR)

4. a) **Explain** the process of economic dispatch using Linear Programming (LP) method. 7 M

b) A two bus system with load at bus 2 only. If 50MW is transmitted from plant 1 to load at bus 2 over the line, the loss is 2.5MW. The incremental production costs at both the plants are

$$\frac{dc_1}{dp_1} = 0.03P_1 + 15$$

and

$$\frac{dc_2}{dp_2} = 0.05P_2 + 20$$

The value of λ is 23 Rs/MWh. Find the generation schedule for economy with losses coordinated. Also calculate the generation schedule if the losses are not coordinated but considered. 8 M

5. a) Show that under steady state condition of controlled two area load frequency control, change in frequency of each area and change in tie line power is zero. 8 M

b) Discuss about automatic generation control implementation. 7 M

(OR)

6. a) Explain the dynamic response of controlled two area system with a neat block diagram. 8 M

b) Discuss about the tie line bias control. 7 M

7. a) Explain the process of calculating optimal power flow combining economic dispatch and the power flow. 8 M

b) Discuss about the Lagrange relaxation procedure to solve unit commitment problem. 7 M

(OR)

8. a) Discuss about different constraints considered in solving a unit commitment problem. 7 M

b) Solve the following unit commitment problem using priority list method for a system load of 600 MW. 8 M

Unit Number	Units Loading		Unit Data (MBtu/hr)	Fuel cost (Rs/MBtu)
	Min	Max		
1	100	500	$500+7P_1+0.0015P_1^2$	1.1
2	110	350	$300+8P_2+0.002P_2^2$	1.0
3	75	225	$100+8\ P_3+0.005P_3^2$	1.2