Code No: **R41024** **R10** **Set No. 1**

IV B.Tech I Semester Supplementary Examinations, October/November - 2017

POWER SYSTEM OPERATION & CONTROL

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1 a) What is meant by economic load dispatch? [5]

b) Two units each of 200 MW in a thermal power plant are operating all the time throughout the year. The maximum and minimum load on each unit is 200 MW and 50 MW respectively. The incremental fuel characteristics for the two units are given as

$$\frac{dC_1}{dP_{G1}} = 15 + 0.08\ P_{G1}\ \text{Rs/ MWh}$$

$$dC_2 / dP_{G2} = 13 + 0.1\ P_{G2}\ \text{Rs/ MWh}$$

Determine the saving in fuel cost in Rs / h for the economic distribution of d total load of 100 MW between two units of the plant. Also compared with equal distribution of the same total load. [10]

2 a) Derive the expression for loss coefficient of two generators connected to the loads through transmission line. State if any assumptions are considered. [7]

b) Two power plants are connected together by a transmission line and load at plant 2 . The data for the loss equations consists of the information that 200MW transmitted from plant 1 to the load results in a Transmission loss of 20 MW. Find the optimum generation schedule considering transmission Losses to supply a load of 204.41 MW. Assume that the incremental fuel cost characteristics of plants are given by

$$\frac{dC_1}{dP_{G1}} = 0.025\ P_{G1} + 14\ \text{Rs/ MWhr}$$

$$\frac{dC_2}{dP_{G2}} = 0.05\ P_{G2} + 16\ \text{Rs/ MWhr}$$

[8]

3 a) Obtain the hydro- thermal scheduling problem. State if any assumptions are considered. [7]

b) A two-plant system having a steam plant near the load centre and a hydro plant at a remote location. The load is 500MW for 16 hrs a day and 350 MW, for 8 hrs a day.

The characteristics of the units are

$C_1 = 120 + 45\ P_{GT} + 0.075\ P_{GT}^2$ Rs./hr

$w_2 = 0.6\ P_{GH} + 0.00283\ P_{GH}^2$ m^3/sec

Loss co-efficient, $B_{22} = 0.002\ MW^{-1}$

Find the generation schedule, daily water used by hydro plant and daily operating cost of thermal plant for γ_j =80 Rs./ m^3-hr. [8]

Code No: **R41024** **R10** **Set No. 1**

4	a)	Contrast between economic load dispatch and unit commitment.	[5]
	b)	Illustrate why do you need unit commitment solution methods? List the methods.	[6]
	c)	What are the constraints considered in unit commitment?	[4]
5		Develop the complete block diagram model of a single area load frequency control system.	[15]
6		Deduce the expression for static error frequency and tie line powers in two area system with neat block diagram.	[15]
7		Prove that the steady state change in frequency response is zero with proportional plus Integral control of single area and draw its block diagram.	[15]
8	a)	What is the need of reactive power compensation in transmission systems?	[7]
	b)	Explain the specifications of load compensator.	[8]