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Set No. 1

Max. Marks: 75

## IV B.Tech I Semester Supplementary Examinations, March - 2017 POWER SYSTEM OPERATION AND CONTROL

(Electrical and Electronics Engineering)

Time: 3 hours

Code No: **R41024** 

## Answer any FIVE Questions All Questions carry equal marks

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- 1 a) Draw incremental fuel cost curve and explain it.
  - b) 150 MW, 220 MW and 220 MW are the ratings of three units located in a thermal power station. Their respective incremental costs are given by the following equations:

dc1/dp1 = Rs(0.11p1 + 12);

dc3/dp3 = Rs(0.1p3 + 13);

dc2/dp2 = Rs(0.095p2 + 14)

Where P1, P2 and P3 are the loads in MW. Determine the economical load allocation between the three units, when the total load on the station is

- i) 350 MW
- ii) 500 MW.

[7]

[7]

[8]

- 2 a) Give algorithm for economic allocation of generation among generators of a thermal system taking into account transmission losses. Give steps for implementing this algorithm and also derive necessary equations. [7]
  - b) Discuss about the optimum generator allocation without line losses. [8]
- 3 a) Explain the hydro-thermal coordination and its importance.
  - b) A two-plant system having a steam plant near the load centre and a hydro plant at a remote location. The load is 520MW for 15 hrs a day and 330 MW, for 9 hrs a day.

The characteristics of the units are

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

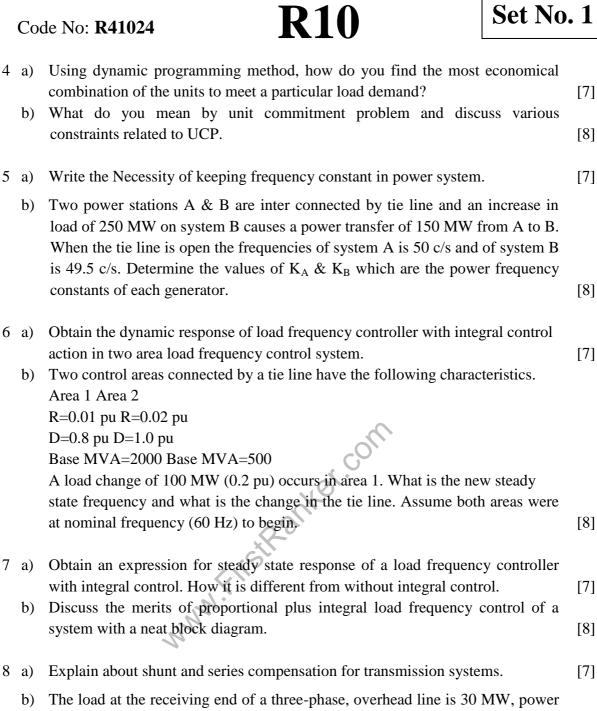
 $w_2 = 0.6 \ P_{GH} + 0.00283 \ P_{GH}^2 \ m^3/sec$ 

Loss co-efficient,  $B_{22} = 0.001 \text{ MW}^{-1}$ 

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

1 of 2





b) The load at the receiving end of a three-phase, overhead line is 30 MW, power factor 0.85 lagging, at a line voltage of 33 kV. A synchronous compensator is situated at the receiving end and the voltage at both ends of the line is maintained at 33 kV. Calculate the MVAr of the compensator. The line has resistance 5 Ω per phase and inductive reactance (line to neutral) 20 ohm per phase.
[8]

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