Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electronics & Electrical) (2011 Onwards E-II)

B.Tech.(Electrical & Electronics) (2013 & Onwards E-II) (Sem.–7,8)

GENERATION AND CONTROL OF POWER

Subject Code : BTEEE-804A

Paper ID : [A3020]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1) Answer the following in short :

a) What do you understand by *'Hydro-thermal Scheduling"*?

b) For a two identical area system, the following data is given.

Speed regulation coefficient R = 5 Hz/p.u. MW, Damping coefficient D = 0.04 p.u.MW/Hz, System frequency = 50 Hz.

The Tie-Line has a capacity of 0.15 p.u. Determine the frequency of oscillations when a step load disturbance occurs, without and with the consideration of damping coefficient. The power angle is 20° just before the occurrence of the load disturbance. Assume inertia constant as 5 seconds.

c) Differentiate between: Priority list method and Dynamic programming.

d) Differentiate between: Economic dispatch problem and Unit commitment problem.

e) How is DC load flow different from AC load flow?

f) Draw the block diagram of a hydro turbine speed governing system.

g) What are the objectives that need to be fulfilled using AVRs for alternators?

h) Explain the limitations of flat Tie-line frequency control method.

i) What do you understand by the term *'Contingency Analysis"*?

j) What is the need of reactive power control?

SECTION-B

2) Discuss in detail, the characteristics of hydro units.

3) Obtain the economic operation schedule for three thermal units delivering a total load of 850MW by neglecting network losses but considering generation limits. The data for units are as under:

Unit 1 $F_C(P_1) = 450 + 7.2P_1 + 0.0017P_1^2$ *Rs/Hr* $200MW \leq P_1 \leq 600MW$

Unit 2 $F_C(P_2) = 300 + 7.5P_2 + 0.002P_2^2$ *Rs/Hr* $150MW \leq P_2 \leq 500MW$

Unit 3 $P_C(P_3) = 180 + 7.7P_3 + 0.005P_3^2$ *Rs/Hr* $200MW \leq P_3 \leq 550MW$

4) Explain, Complete Tie-Line bias control applied to a two area system.

5) Explain the application of sensitivity method for correcting the generation dispatch.

6) Two control areas have the following characteristics

Area 1: $R_1 = 0.011$ p.u., $D_1 = 0.85$ p.u., Base MVA = 1000

Area 2: $R_2 = 0.018$ p.u., $D_2 = 0.95$ p.u., Base MVA = 1000

A load change of 200MW occurs in area 1. Determine the new steady state frequency. Also, determine the tie-line power flow deviation.

SECTION-C

7) What do you understand by *'Hydro-Thermal Scheduling'*? Discuss Lambda-Gamma iteration method for obtaining the solution of short-range fixed-head Hydro-Thermal scheduling.

8) Draw the flow chart and write the algorithm of the operation of parallel AC and DC system.

9) Write short notes on **ANY TWO** the following :

a) General modeling of DC links

b) P-f controller

c) Linear Programming