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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  $R = 5 \text{ Hz/p.u. MW}$ , Damping coefficient  $D = 0.04 \text{ p.u. MW/Hz}$ , 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  $20^\circ$  just before the occurrence of the load disturbance. Assume inertia constant as 5 seconds. <http://www.punjabpapers.com>

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 AVR 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:

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

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

$$\text{Unit 3 } F_C(P_3) = 180 + 7.7P_3 + 0.005P_3^2 \text{ Rs/Hr} \quad 200MW \leq P_3 \leq 550MW$$

- 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. <http://www.punjabpapers.com>
- 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