Exam. Code: 1017
Sub. Code: 7780

1129

M.E. Electrical Engineering (Power Systems)

1st Semester

EE-8102: Power System Operation and Control

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt **any five** questions.*

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I. (a) Discuss the various functions of energy control centre.

(b) Explain the operating states of a power systems in the security perspective with an example. (5+5)

II. (a) Define power system stability and classify it on the basis of nature of disturbance.

(b) Derive the expression for exact coordination equation. (5+5)

III. Explain the load frequency control by turbine speed governing system and derive the speed governing model. (10)

IV. Explain the need of hydro thermal coordination. Also explain the problems of scheduling hydro thermal power plants. Derive the equations for optimal scheduling of hydrothermal interconnected power plants. (10)

V. State the unit commitment problem. Explain priority list method of unit commitment problem in detail. What are the different constraints in unit commitment. (10)

VI. State the control objection of two area load frequency control. Two generators rated 200mw and 400mw aer operating in parallel. The droop characteristic of their governors are 4% and 5% resp. from no-load to full load. Assume that generators are operating at 50Hz at no load, how would a load of 600mw be shared between them? What will be the system frequency at this load? (10)

P.T.O.

VII. Determine the economic operation point for the three thermal units delivering a total load of 600mw without considering generator limit as well as with considering generator limit:

Unit I ⇒ Max^m O/P = 600MW

Min^m O/P = 150MW

$$F_1 = 550 + 7.7P_1 + 0.00165 \quad P_1^2 \quad Rs/hr$$

Unit II ⇒ Max^m O/P = 500MW

Min^m O/P = 125MW

$$F_2 = 300 + 7.88P_2 + 0.002 \quad P_2^2 \quad Rs/hr$$

Unit III ⇒ Max^m O/P = 600MW

Min^m O/P = 150MW

$$F_3 = 80 + 7.99P_3 + 0.005 \quad P_3^2 \quad Rs/hr$$

(10)

VIII. Write note on the following: -

(a) SCADA and EMS functions

(b) State transitions and control strategies

(5+5)

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