Code No: 117GQ **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, November/December - 2016

POWER SYSTEM OPERATION AND CONTROL

(Electrical and Electronics Engineering)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What is a penalty factor in economic scheduling? [2]
b) Define the incremental fuel and production costs. [3]
c) Draw the hydro electric plant model. [2]
d) What are the important methods of hydro-thermal coordination? [3]
e) Draw the block diagram representation of steam turbine. [2]
f) What is the need of excitation system? [3]
g) What is the need of integral control in single area LFC System? [2]
h) What is meant by area control error in two area system? [3]
i) What are the specifications of load compensator? [2]
j) What is the need of reactive power control in power system? [3]

PART-B

(50 Marks)

2.a) Explain the need of economical load dispatch for a given power system.
b) A system consisting of two plants connected by a tie line and load is located at plant-2. When 100MW is transmitted from plant-1, a loss of 10MW takes place on the tie line. Determine the generation schedule at both the plants and the power received by load when λ of the system is 25Rs/MWh and IFC are given by

$$\frac{dc_1}{dp_1} = 0.03P_1+17 \text{ Rs/MWh}, \quad \frac{dc_2}{dp_2} = 0.06P_2+19 \text{ Rs/MWh}. \qquad [5+5]$$

OR

3. Derive the transmission loss formula for a system consisting of n-generating plants supplying several loads inter connected through a transmission networks. State any assumptions are made. [10]

4. Obtain the condition for economic generation of steam and hydro plants for short term scheduling. State the any assumptions are considered. [10]

OR

5. Describe the hydro thermal economic load scheduling. Derive the necessary equations? [10]

6. Explain the functioning of speed governing system and obtain its necessary mathematical modeling with neat diagram. [10]

OR

7.a) Describe the fundamental characteristics of an excitation system
b) Draw and explain the block diagram representation of IEEE Type-1 model. [5+5]

8. For a single area system, show that the static error in frequency can be reduced to zero for single area load frequency control with integral control. [10]

OR

9.a) What are the basic requirements needed for control strategy in LFC system
b) Obtain the mathematical modeling of tie line power in an inter connected system and its block diagram. [5+5]

10.a) Compare the different types of compensating equipment for transmission system?
b) Explain the uncompensated and compensated transmission lines. [5+5]

OR

11.a) What are the merits and demerits of shunt and series compensation?
b) Describe the reactive power compensation in transmission systems. [5+5]

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