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NEE-031/NEN-031

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2012380

Roll No.

B.TECH.

Regular Theory Examination (Odd Sem VII) Examination, 2016-17

POWER SYSTEM OPERATION & CONTROL

Time : 3 Hours *Max. Marks : 100*

Note: Attempt all sections.

Section - A

1 Attempt all parts of the following questions. **(10×2=20)**

a) What is transmission loss in power system?

b) What are excitation systems in synchronous generator?

c) Define FACTS controller.

d) Write full form of SCADA.

e) What do you understand by Penalty factor in economic operation of power system?

f) What are the specifications of load compensator?

g) Explain the concept of voltage control in power system.

h) Explain the advantages of PID control in load frequency control.

i) List different types of Shunt compensators.

j) Explain the role of State Estimation in power system.

Section - B

Note: Attempt any five parts of the following **(5×10=50)**

2. What is Unit Commitment problem? Discuss the constraints in Unit Commitment.
3. Derive the condition for optimal operation of thermal units without considering the transmission losses using the method of Langrange multipliers.
4. Explain the automatic load frequency control (ALFC) of single-area systems using simple functional diagram. Develop the block diagram of ALFC .
5. Discuss the need and function of state estimation. Explain the difference between static-state estimation and dynamic-state estimation.
6. A 500 MW generator is operating at a load of 20 MW. A load change of 1% causes the frequency to change by 1%. If the system frequency is 50 Hz. Determine the value of load damping factor in per unit.
7. Why load prediction is necessary in power system operation. Explain.

8. Explain the hydrothermal economic load scheduling. Derive the necessary equations.

9. Describe the construction and working of various types of static compensators.

Section - C

Note: **Attempt any two parts of the following.** **(2×15=30)**

10. What are the various types of FACTS devices? Explain the operating principle and characteristics of PAR and UPFC with neat diagram. Mention their role in power systems.

11. Derive the model of a speed governing system and represent it by a block diagram.

12. Draw and discuss input-output curve, incremental water rate curve and incremental, production cost curve with reference to hydro power plants.