

Paper Id:

120711

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B TECH
(SEM VII) THEORY EXAMINATION 2019-20
POWER SYSTEM OPERATION AND CONTROL

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 10 = 20**

- a. What are the functions of control center?
- b. What is congestion?
- c. What are the known and unknown in the different bus classifications?
- d. What is advantage of FDLF method?
- e. Define economic load dispatch.
- f. What is single area?
- g. What is a varistor?
- h. What is static var compensator?
- i. What is the necessity of compensation?
- j. What is SCADA master unit?

SECTION B**2. Attempt any three of the following: 10x3=30**

- a. Explain a typical power system from generation to distribution level with schematic diagram. What do you mean by level decomposition in power system networks?
- b. Why load prediction is necessary in power system operation? Explain.
- c. What is the objective in economic scheduling? Also drive the condition for optimal allocation of total load among units in a thermal station when losses are not neglected
- d. Discuss the need and function of state estimation. Explain the difference between static state estimation and dynamic state estimation.
- e. What are various types of FACTS devices?

SECTION C**3. Attempt any one part of the following: 10x1=10**

- a. Explain the various level of hierarchy of operation in the power system.
- b. Explain the overview of energy management system.

4. Attempt any one part of the following: 10x1=10

- a. Compare the load flow problem and OPF problem.
- b. Define input-output characteristics, heat rate and incremental cost.

5. Attempt any one part of the following: 10x1=10

- a. Consider a steam station with two units the input - output characteristics being specified by

$$F_1 = 60 + 6P_1 + 0.012 P_1^2 \text{ and } F_2 = 110 + 6P_2 + 0.04 P_2^2$$

In scheduling a load of 120 MW by equal incremental cost method, the incremental cost of unit 1 is specified wrongly by 15% more than the true value while that of unit 2 is specified by 6% less than the true value Find (i) The change in generation schedules and (ii) The change in the total cost of generation.

- b. Draw and explain the block diagram of load frequency control of two area system. Also determine the steady state and dynamic response of two area system.

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6. Attempt any *one* part of the following: 10x1=10

- a. What are the functions and requirements of the excitation system?
- b. Explain how voltage and reactive power is controlled using suitable expression.

7. Attempt any *one* part of the following: 10x1=10

- a. Write a short note on:
 - i. Shunt compensation
 - ii. Phase angle compensation
 - iii. Tap changing transformer
- b. What do you mean by “load frequency control” in power system environments? Also mention its merit demerits. Develop the mathematical model of Turbine speed governing system.

ANIMESH AGARWAL

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