Sub Code:EEE031

Paper Id: 120701 Roll No: | | | | | | | | | | | | | |

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 is bilateral transaction?
b. What is inter-connected system?
c. Explain objective and constraint of OPF?
d. What are the control variables of the OPF?
e. What is the need for unit commitment?
f. Describe SCADA master unit?
g. Write the static performance of AVR loop?
h. What is the necessity of compensation?
i. What is a tie line?
j. What is synchronous condenser?

SECTION B

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

a. Explain the various level of hierarchy of operation in the power system.
b. Discuss the need and function of state estimation. Explain the difference between static state estimation and dynamic state estimation.
c. Mention the objective function and constraints of the OPF problem.
d. What are various types of FACTS devices?
e. 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.

SECTION C

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

a. Explain SCADA in details.
b. Explain voltage stability analysis.

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

a. Discuss the load allocation in power plants. What information must be available for optimum load allocation?
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

$$F_1 = 80 + 8\,P_1 + 0.024\,P_1^2 \; and \; F_2 = 120 + 6\,P_2 + 0.04\,P_2^2$$

In scheduling a load of 100 MW by equal incremental cost method, the incremental cost of unit 1 is specified wrongly by 10% 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. Explain the methods of voltage control, stating the merits and demerits of each method.

b. Explain the load compensator with a neat diagram.

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

a. Draw and explain the block diagram of load frequency control of single area system. Also determine the steady state and dynamic response of single area system.

b. Write a short note on:

i. Shunt compensation

ii. Phase angle compensation

iii. Tap changing transformer