Printed Pages : 5 | 142 | EEE-031

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

Paper ID : 120751 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VII) THEORY EXAMINATION, 2015-16

POWER SYSTEM OPERATION & CONTROL

[Time : 3 hours] [Total Marks : 100]

Section-A

1. Attempt all sections. All sections carry **equal** marks. Write answer of each section in short. (10x2=20)

   (a) Enumerate the advantages & Disadvantages of SCADA System?

   (b) What is voltage instability?

   (c) What is the unit of incremental costs?

   (d) Distinguish between the problem of economic dispatch and unit commitment.

   (e) Why is maintenance of frequency inportant?

(f) Why is power systems interconnected?

(g) Discuss the importance of compensation in Power system.

(h) What are the limitations of Load tap changing transformer method of voltage control?

(i) Define State estimation in Power System environment.

(j) What does SVC stand for? State its application in power system.

Section-B

Attempt **any five** questions from this section. (10×5=50)

2. Explain the following:

(I) POWER SYSTEM STABILITY.

(II) POWER SYSTEM SECURITY

Also mention their importance and limitations.

3. Describe the structure of power system environment with neat diagram. Explain different voltage levels used from generating station to load point. Mention various operation stages of power system environments. Explain using state transition diagram.

4. On the system consisting of two generating plants the incremental costs in rupees per megawatt hour with P1 and P2 in megawatts are

$\frac{dC_1}{dP_1}$ =0.015pl+20 Rs/MWh

$\frac{dC_2}{dP_{12}}$ =0.015p2+22.5Rs/MWh

The system is operating on economic dispatch with P1=P2=100 MW and

$\frac{\partial P_L}{\partial P_2}$ = 0.2. Find the Penalty factor of plant 1 and the incremental cost of received power.

5. Develop the mathematical model of Speed Turbine Model & Generator Load Model. Mention their importance & Limitations.

6. Two generators are supplying power to a system. Their ratings are 50 and 500 MW respestively. The frequency is 50 Hz and each generator is half-loaded. The system load increases by 110 MW and as a result the frequency drops to 49.5 Hz. What must the individual regulation be if the two generators should increase their turbine powers in proportional to their ratings?

7. Draw and explain a schematic diagram of brushless excitation system.

8. (a) What is the need of reactive power compensation?

   (b) Explain Phase Angle compensatiopn & Shunt Compensation. Also mention their advantages/ disadvantages and utilities in power system networks.

9. What is state estimation? How it helps the power engineer for control and operation of power system?

Section-C

Attempt **any two** sections. Each section carries equal marks. (2x15=30)

10. (a) Discuss the role of national load dispatch centre. Draw the block diagram of various level in power system.

    (b) What is the objective in economic scheduling? Also derive the condition for optimal allocation of total load among units in a thermal station when losses are not neglected.

11. (a) What do you mean by "LOAD FREQUENCY CONTROL SYSTEM" in power system environments? Also mention the advantages and disadvantages of single area and double area load frequency control systems in power system environments.

    (b) Write the parameters and factors for specifying a load compensator.

12. Explain the structure detail and working principle of following FACTS controllers"

    (i) TC-PAR

    (ii) STATCOM

    (iii) UPFC

    (iv) TSSC

    (v) SSSC

—x—