



Printed Pages : 3

TEE - 703

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

**PAPER ID : 0676**

Roll No.

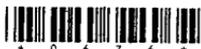
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**B. Tech.****(SEM. VIII) EXAMINATION, 2008-09****POWER SYSTEM OPERATION & CONTROL***Time : 3 Hours]**[Total Marks : 100*

- Note :**
- (1) Attempt **all** questions.
  - (2) All questions carry **equal** marks.
  - (3) Be precise in your answer.
  - (4) No second answer book will be provided.

**1** Attempt any **four** parts of the following :

- (a) Discuss main function of SCADA system.
- (b) Draw a schematic diagram of a typical power system from generation to distribution level.
- (c) A load bus is composed of induction motor where the nominal reactive power is 1 pu. The shunt compensation is  $K_{sh}$ . Find the reactive power sensitivity at the bus with respect to change in voltage.
- (d) Discuss how PV curves can be used for voltage stability of a radial power system?
- (e) Discuss use of line outage distribution factor in sensitivity analysis.
- (f) How are the hydel plants classified? Discuss briefly.



- 2 Attempt any **four** parts of the following :
- What are the various system constraints in economic operation of power system? Discuss.
  - Differentiate between 'base load and 'peak load'. How the load allocation is done among various types of power stations?
  - Derive the penalty factor method from coordination equations.
  - A constant load of 300 MW is supplied by two 200 MW generators, 1 and 2, for which the respective incremental fuel costs are :

$$\frac{dC_1}{dP_{G1}} = 0.10P_{G1} + 20$$

$$\frac{dC_2}{dP_{G2}} = 0.12P_{G2} + 15$$

Determine the most economical division of the load between the generators.

- How the optimal scheduling of a hydrothermal plant is done? Discuss.
  - Discuss various steps to be followed steepest descent method.
- 3 Attempt any **two** parts of the following :
- Draw complete block diagram for the load frequency control of an isolated power system.
  - With a neat diagram, explain briefly different parts of a turbine governing system.
  - Two generators rated at 120 MW and 250 MW are operating in parallel. The governor setting on the machines are such that they have 4% and 3% droop. Determine the load taken by each machine for a total load of 200 MW.



4 Attempt any **two** parts of the following :

- (a) Draw a schematic diagram of a brushless excitation system.
- (b) What is the effect of the on-load tap changing transformer on voltage stability? Discuss.
- (c) What are the merits and demerits of series compensation?

5 Attempt any **two** parts of the following :

- (a) Draw a flow chart for non linear measurement of data.
  - (b) Describe working of a TCSC. Also draw impedance vs delay angle characteristic of TCSC.
  - (c) Discuss basic operating principle of STATCOM.
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