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

PAPER ID : 0676 Roll No.

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 :

(a) What are the various system constraints in economic opration of power system? Discuss.

(b) Defferentiate between 'base load and 'peak load'. How the load allocation is done among various types of power stations?

(c) Derive the penalty factor method from coordination equations.

(d) 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.

(e) How the optimal scheduling of a hydrothermal plant is done? Discuss.

(f) Discuss various steps to be followed steepest descent method.

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

(a) Draw complete block diagram for the load frequency control of an isolated power system.

(b) With a neat diagram, explain briefly different parts of a turbine governing system.

(c) 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.
