

feeder. If it is desired to correct the power factor of the load a lagging power factor of 0.96 by connecting three capacitors at the load, determine the following :

- (i) The rating of the capacitor bank, in kilovars.
 - (ii) The capacitance of each unit if the capacitors are connected in delta, in microfarads.
- (c) Discuss with appropriate phasor diagram, various methods of voltage control.

Attempt any **two** parts of the following : $2 \times 10 = 20$

- (a) Explain the concept and objective of TCSC. What is SSR ? Explain how it is nulled in the system.
- (b) What are the different FACTS controller ? Explain working principle and role of UPFC in power system.
- (c) Write the short notes on the following :
 - (i) Linear model state estimation for power system.
 - (ii) STATCOM.



Printed Pages : 4

TEE-703

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

PAPER ID : 0202

Roll No.

B. Tech.

(SEM. VII) EXAMINATION, 2008-09
POWER SYSTEM OPERATION & CONTROL

Time : 3 Hours]

[Total Marks : 100

- Note :
- (i) Attempt all the questions.
 - (ii) All questions carry equal marks.
 - (iii) Be precise in your answer.
 - (iv) No second answer book will be provided.

1 Attempt any **four** parts of the following : $5 \times 4 = 20$

- (a) Write the limitations and demerits of the interconnected system.
- (b) With the help of the block diagram; explain the division of tasks between various control centres of SCADA.
- (c) Draw the block diagram of power system security levels and its analysis.
- (d) Draw the automatic load dispatching schematic diagram.
- (e) What do you understand by the power system voltage stability ? Explain various reasons for instability of the power system.



2 Attempt any **four** parts of the following : $5 \times 4 = 20$

- (a) Explain the optimal scheduling of hydrothermal system.
- (b) Draw and explain the input and output characteristic of thermal and hydro-plants.
- (c) Draw the flow chart for the economic scheduling; when transmission losses are considered.
- (d) The fuel inputs to two plants are given by $F_1 = 0.2P_1^2 + 40P_1 + 120$ Rs/hour and $F_2 = 0.25P_2^2 + 30P_2 + 150$ Rs/hr. The load to be met is 200 MW. Determine the economic operating schedule and the corresponding cost of generation if the maximum and minimum loading on each unit is 100 MW and 25 MW; the demand is 180 MW while transmission line losses are neglected. If the load is equally shared by both of units, determine the saving obtained by loading the units as per equal incremental fuel cost.
- (e) By the Lagrange multipliers find the penalty factor of plant n " L_n ".

3 Attempt any **two** parts of the following : $2 \times 10 = 20$

- (a) Explain the working of two area load frequency control by its block diagram.
- (b) Two generators rated 250 MW and 350 MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively from no load to full load. The speed changers are so set that the generators operate at 50 Hz sharing the full load of 600 MW in the ratio of their ratings. If the load reduces to 300 MW, how will it be shared among the generators and what will system frequency be? Assume free governor operation.
- (c) With the help of the block diagram; explain the dynamic response and steady state response of proportional plus integral plus derivative control of single area system.

Attempt any **two** parts of the following : $2 \times 10 = 20$

- (a) Draw the functional block diagram of a field controlled alternator rectifier excitation system; also explain the working of its various blocks.
- (b) Assume that a three-phase 500 HP 50 Hz 440 kilo-volt wye-connected induction motor has a full load efficiency of 88%, a lagging power factor of 0.70, and is connected to a