Code: EE7T1

IV B.Tech - I Semester – Regular Examinations – October - 2017

POWER SYSTEM OPERATION AND CONTROL
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer *all* the questions.   All questions carry equal marks
$$11 \times 2 = 22$$

1.
   a) What is an incremental fuel cost? How it is used in thermal plant operation?
   b) What is the objective of economic load scheduling?
   c) What is penalty factor and write its significance.
   d) Write the objective function expression of hydro thermal scheduling problem.
   e) What are the main parts of speed governing system?
   f) Define area control error.
   g) Define tie line bias control.
   h) State the advantages of having high power factor in the power system.
   i) State the disadvantages of series capacitors.
   j) What are the advantages of tap changing transformer?
   k) What is the purpose of reactive power compensation?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) Derive the condition for optimality when two generators are operating in parallel. Neglect line losses.   8 M

   b) The fuel inputs to two plants are given by

   $F_1 = 0.015P_1^2 + 16P_1 + 50$

   $F_2 = 0.025P_2^2 + 12P_2 + 30$

   The loss coefficients of the system are given by $B_{11} = 0.005$, $B_{12} = -0.0012$ and $B_{22} = 0.002$. The load to be meet is 200 MW; determine the economic operating schedule and the corresponding cost of generation if the transmission line losses are coordinated.   8 M

3.   A two plant system has a steam plant near the load centre and hydro plant at a remote location. The characteristics of both the stations are

   $C_1 = (0.045P_T + 26) \ P_T$ Rs/hr $W_2 = (0.004P_H + 7) \ P_H$ m^3/sec.

   And $\gamma_2 = 4 \times 10^{-4}$ Rs/m^3 and $B_{22} = 0.0025$ MW^{-1}. Determine the power generation at each station and power received by the load when $\lambda = 65$ Rs/MWh.   16 M

4. a) Two synchronous generators operate in parallel and supply a total load of 400MW. The capacities of the machines are 200MW and 500MW and both have generator droop

characteristics of 4% from no load to full load. Calculate the load taken by each machine. Also find the system frequency at this load. Assume free governor operation.

8 M

b) Explain about the proportional plus integral load frequency control with block diagram for single area system.   8 M

5. a) Discuss operation of synchronous condenser.   8 M

b) Explain the different methods of voltage control briefly.

8 M

6. a) Briefly explain advantages and disadvantages of different types of compensating equipment for transmission system.

8 M

b) What are the specifications of load compensator?   8 M