PVP 14

Code: EE7T1

IV B.Tech - I Semester – Regular/Supplementary Examinations
March 2021

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 x 2 = 22 M

1. a) Discuss the concept of incremental fuel cost in brief.
   b) Write the expression of Penalty factor and discuss the terms involved in it.
   c) Draw the heat rate curve.
   d) What is short term hydro thermal scheduling problem?
   e) What is the essence of hydro thermal scheduling in power system?
   f) Explain the necessity of keeping the frequency constant in power system.
   g) Explain the term ‘dynamic response’.
   h) What are the causes for low power factor?
   i) How is the synchronous condenser different from static condenser?
   j) What is the need for reactive power compensation in power systems?
   k) Discuss the concept of load compensation in brief.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.
3 x 16 = 48 M

2. a) Explain the step by step procedure for computing economic allocation of generation in a thermal station. 6 M

b) In a thermal power station, incremental cost are given by the following equations:
dC_1 / dP_1 = Rs.$(0.15P_1+12)$;
dC_3 / dP_3 = Rs.$(0.21P_3+13)$;
dC_2 / dP_2 = Rs.$(0.05P_2+14)$;
Where P_1, P_2 and P_3 are the loads in MW. Evaluate the economical load allocation between the three units, when the total load on the station is 300 MW. 10 M

3. a) Explain clearly the mathematical formulation of optimal scheduling of hydrothermal system with a typical example. 8 M

b) Discuss the concept of hydroelectric power plant models in detail. 8 M

4. a) With a neat block diagram explain the load frequency control for a single area system. 8 M

b) Two turbo alternators rated for 110 MW and 220 MW have governor droop characteristics of 5% from no load to full load. They are connected in parallel to share a load of 250 MW. Determine the load shared by each machine assuming free governor action. 8 M

5. a) Discuss the concept of Voltage control in detail. 8 M

b) A 440V, 3-Ø distribution feeder has a load of 100 KW at lagging p.f. with the load current of 200A. If the p.f. is to be improved, determine the following:
   i) Uncorrected p.f. and reactive load
   ii) New corrected p.f. after installing a shunt capacitor of 75 KVAR. 8 M

6. a) What is series compensation? Explain the advantages of series compensation. 8 M

b) Explain the effect of shunt compensation on the transmission line performance. 8 M