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**B.TECH**  
**(SEM VII) THEORY EXAMINATION 2020-21**  
**POWER SYSTEM OPERATION & CONTROL**

**Time: 3 Hours****Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

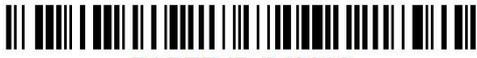
a.	What is Area Control Error?
b.	Define "Power system stability".
c.	What do you mean by "Penalty Factor" in economic dispatch?
d.	Draw the input-output characteristics of hydro power plant.
e.	Explain the power system static security level with suitable diagram.
f.	What are the merits & demerits of interconnected power system network?
g.	What you mean by unit commitment?
h.	What do you mean by "Real Time Computer Control" in power system environments?
i.	Write any four methods of voltage control?
j.	Highlight the role of FACTS devices in ever expanding electrical power system network.

**SECTION B****2. Attempt any three of the following:****10x3=30**

a.	What do you mean by "SCADA" system? Discuss the "SCADA" system, with the help of block diagram. Also mention its advantage and disadvantage.
b.	How can the effect of transmission loss be included in optimum scheduling in power plant?
c.	Explain UPFC with characteristics, operating principle and neat diagram.
d.	Incremental fuel costs in rupees per MWh for a plant consisting of two units are: $dC_1/dP_{G1} = 0.20 dP_{G1} + 40$ $dC_2/dP_{G2} = 0.40 dP_{G2} + 30$ ; and the generator limits are $30MW \leq P_{G1} \leq 175 MW$ and $20MW \leq P_{G2} \leq 125 MW$ Assume that both the units operating all the time. How will the load be shared between the two units as the system load varies over the full range of the load values? What are the corresponding values of the plant incremental costs?
e.	Explain the following: (a) Series compensation (b) Shunt compensation (c) Phase angle compensation

**SECTION C****3. Attempt any one part of the following:****10x1=10**

a.	Define "Power System Voltage Stability". Explain the various reasons for instability of the power system.
b.	Draw input output curve for thermal power plant and hydro power plant.



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**4. Attempt any one part of the following: 10x1=10**

a.	What is it necessary to consider transmission loss in optimum scheduling?
b.	What are the difference between Automatic Voltage Regulator (AVR) and Automatic Load Frequency Control (ALFC)? Also discuss AVR with diagram.

**5. Attempt any one part of the following: 10x1=10**

a.	What do you mean by “DOUBLE AREA LOAD FREQUENCY CONTROL”? Determine the steady state and dynamic response of single area system.
b.	Writes short notes on the following: (i) STATE ESTIMATIONS (ii) POWER SYSTEM SECURITY

**6. Attempt any one part of the following: 10x1=10**

a.	What do you mean by “load frequency control” in power system environments? Also mention its merit demerits. Develop the mathematical model of Turbine speed governing system.
b.	Two synchronous generators are operating in parallel. Their capacities are 300 MW and 400 MW. Their droop characteristics of their governor are 4% to 5% from no load to full load. Assuming that the generators are operating at 50 Hz at no load to full load, how would be a load of 600 MW shared between them. What is the system frequency at this load? Assume free governor action.

**7. Attempt any one part of the following: 10x1=10**

a.	Explain the following FACTS controllers- (a) TSSC (b) TCSC (c) SVC (d) SSSC (e) TCR & TSC
b.	What do you mean by “State Estimation” in power system environment? Also mention its advantages, disadvantages and importance in power system environment