GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–VIII (NEW) EXAMINATION – WINTER 2024

Subject Code:2180909   **Date:26-11-2024**
Subject Name: Power System Operation and Control
Time:02:30 PM TO 05:00 PM   **Total Marks:70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain load frequency control.	**03**
	(b)	Explain turbine speed governing mechanism.	**04**
	(c)	Draw and explain the block diagram of load frequency control in two-area control system.	**07**
Q.2	**(a)**	Explain how system blackout occur.	**03**
	(b)	Explain the generator shift factor and line outage factor concepts of power system security.	**04**
	(c)	What is power system security? Explain Power system security levels in detail.	**07**
		OR	
	(c)	Establish relationship between voltage regulation and reactive power. Explain how it is governed by short circuits capacity.	**07**
Q.3	**(a)**	Obtain necessary relation between maximum power and line length.	**03**
	(b)	Explain role of reactive power for voltage collapse.	**04**
	(c)	Enlist different types of reactive power compensation methods for heavily loaded and voltage stressed power system. Explain Static VAR compensator in detail.	**07**
		OR	
Q.3	**(a)**	Define the Surge Impedance loading of Transmission Line.	**03**
	(b)	Explain classification of Voltage Stability.	**04**
	(c)	Derive the expression for critical receiving end voltage and critical power angle at voltage stability limit for a two bus power system.	**07**
Q.4	**(a)**	What is state estimation? Write its importance in PSOC.	**03**
	(b)	Explain static state estimation of power system.	**04**
	(c)	Discuss weighted least square estimation technique.	**07**
		OR	
Q.4	**(a)**	Discuss the Application of Power System State Estimation.	**03**
	(b)	Explain tracking state estimation of power system.	**04**
	(c)	Explain bad data measurement and its process for data treatment in state estimation.	**07**
Q.5	**(a)**	Summarize nature of load forecasting based on lead time with application.	**03**
	(b)	Discuss reactive power load forecasting	**04**
	(c)	Describe Auto-Regressive Model and Auto- regressive Moving Average Model for load forecasting.	**07**
		OR	
Q.5	**(a)**	Explain various Players involved in the Indian Power sector.	**03**
	(b)	Describe the need for deregulation of various power system	**04**
	(c)	Explain electrical market entities and model in brief.	**07**

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