Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3170919 Date:12-01-2023

Subject Name:Power System Operation and Control

Time:10:30 AM TO 01:00 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)**	List main components of the Automatic voltage control scheme.	**03**
	(b)	Define: (1) Generator Shift Factor and (2) Line Outage Distribution Factor	**04**
	(c)	Explain the turbine speed governing mechanism.	**07**
Q.2	**(a)**	Discuss the sources of reactive power generation in the power systems.	**03**
	(b)	Explain surge impedance loading with its expression	**04**
	(c)	Derive the expression for voltage regulation of a transmission line and explain its relation with reactive power	**07**
		OR	
	(c)	Enlist different types of reactive power compensation methods for heavily loaded and voltage-stressed power systems. Explain static VAR compensators in detail.	**07**
Q.3	**(a)**	Describe the various operating states of power systems	**03**
	(b)	Give flow chart for contingency selection	**04**
	(c)	What is power system security? Explain the major three functions of a power system security and system state classification.	**07**
		OR	
Q.3	**(a)**	What do you mean by state estimation?	**03**
	(b)	Explain contingency analysis of power system	**04**
	(c)	What is bad data in state estimation? How bad data are detected and suppressed in state estimation?	**07**
Q.4	**(a)**	What is the role of load forecasting? How is it reflected in current and future trends?	**03**
	(b)	State different load forecasting techniques. Explain in detail the reactive load forecasting. Also, state its advantages.	**04**
	(c)	Discuss estimation of average and trend terms for any load data.	**07**
		OR	
Q.4	**(a)**	Define load forecasting. Give a summary of the nature of load forecasting based on lead time with its application	**03**
	(b)	Explain Kalman Filtering Approach for load forecasting.	**04**
	(c)	Describe Auto-Regressive Model and Autoregressive Moving Average Model for load forecasting	**07**
Q.5	**(a)**	Define Reactive power with its importance.	**03**
	(b)	Explain the function of different entities in deregulated power system	**04**
	(c)	Discuss the present scenario of power system structure in India	**07**
		OR	
Q.5	**(a)**	What is deregulation? Enlist the advantages of deregulation.	**03**

(b) Describe least square approximation state estimation. **04**

(c) Define voltage collapse. Enlist the main factors that contribute to the phenomena of voltage collapse **07**

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