Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3170919 Date:29/12/2021

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)**	What is deregulation? Enlist the advantages of deregulation.	**03**
	(b)	Explain restoration process of black out.	**04**
	(c)	Explain turbine speed governing mechanism.	**07**
Q.2	**(a)**	List main components of Automatic voltage control scheme.	**03**
	(b)	Define: (1) Generator Shift Factor and (2) Line Outage Distribution Factor	**04**
	(c)	Obtain the expression for reactive power requirement of uncompensated line.	**07**
		OR	
	(c)	Develop a relation between voltage and reactive power at a node in power system.	**07**
Q.3	**(a)**	Explain surge impedance loading with it expression.	**03**
	(b)	Two alternators rated for 120 MW and 220 MW have generator drop characteristic of 5% from no load to full load. They are connected in parallel to share a load of 275 MW. Determine the load shared by each machine assuming free governing action.	**04**
	(c)	For a transmission line connected between two buses, derive the expression of voltage regulation and also prove from the phasor diagram that the Q and V have a strong coupling.	**07**
		OR	
Q.3	**(a)**	Give comparison between voltage stability and angle stability	**03**
	(b)	Define voltage collapse. Enlist the main factors that contribute the phenomena of voltage collapse.	**04**
	(c)	Explain function of different entities in deregulated power system.	**07**

Q.4	**(a)**	What do you mean by state estimation?	**03**
	(b)	Explain various applications of state estimations in power systems.	**04**
	(c)	What is bad data in state estimation? How bad data are detected and suppress in state estimation.	**07**
		OR	
Q.4	**(a)**	What do you mean by Network Obeservability and Pseudo Measurement?	**03**
	(b)	Discuss the role of research and professional bodies in Indian power sector.	**04**
	(c)	Discuss present scenario of power system structure in India.	**07**
Q.5	**(a)**	Explain the meaning of contingency analysis.	**03**
	(b)	Describe least square approximation state estimation.	**04**
	(c)	Give flow chart for contingency selection.	**07**
		OR	
Q.5	**(a)**	List out different load forecasting methods.	**03**
	(b)	Explain the various state of power system.	**04**
	(c)	Describe Auto-Regressive Model and Auto- regressive Moving Average Model for load forecasting.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170919 Date:10/06/2022

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 the concept of SIL with necessary calculations.	**03**
	(b)	Explain about the combined operation of load frequency control & Economic Dispatch control.	**04**
	(c)	Explain optimal load frequency control for two area control system.	**07**
Q.2	**(a)**	Explain the role of Power System Security in Power System Operation.	**03**
	(b)	Give the classification of Various State of Power system.	**04**
	(c)	Develop a relation between voltage and reactive power at a node in a power system.	**07**
		OR	
	(c)	What is decoupling concept? Show that for a lossless transmission two-bus model, Q-V and P-δ quantities are closely coupled.	**07**
Q.3	**(a)**	Explain the reactive loss characteristics of a transmission line.	**03**
	(b)	Explain the concept of state estimation and briefly describe the necessity of state estimation.	**04**
	(c)	Explain the concept of contingency Analysis and Derive the equations of sensitivity factors in the system.	**07**
		OR	
Q.3	**(a)**	Explain Network Observability and Pseudo-Measurements.	**03**
	(b)	What is load forecasting? Give its objectives.	**04**
	(c)	Explain function of different entities in Deregulated Power System.	**07**
Q.4	**(a)**	Give the Comparison of Static and Dynamic State Estimation.	**03**
	(b)	Obtain the necessary relation between maximum power and line length.	**04**
	(c)	Describe Auto Regressive Model and Auto Regressive Moving Average Model for load forecasting.	**07**
		OR	
Q.4	**(a)**	What is line load ability? Obtain an expression for load ability.	**03**
	(b)	Give Flow chart of one scheme of Fast Decoupled State Estimation.	**04**
	(c)	List the entities involved in Electricity market and its role in restructuring power system.	**07**
Q.5	**(a)**	Explain the least square method for state estimation.	**03**
	(b)	List Out Different Load Forecasting Methods.	**04**
	(c)	Explain the factors which motivate for the Restructuring and Deregulation of Power System.	**07**
		OR	

Q.5	**(a)**	Express Computational Considerations of state estimation of power system.	**03**
	(b)	State and explain the techniques use for data treatment.	**04**
	(c)	Explain Tracking State Estimation of Power Systems.	**07**

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