Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3170921 Date: 21/06/2023

Subject Name: Power Quality and FACTS

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)**	With necessary waveforms, discuss in detail the following Power Quality Disturbances i) Voltage Sag iii) Harmonics ii) Voltage Swell	**03**
	(b)	Discuss the need of reliability indices and explain the following terms: SAIFI, SAIDI, CAIFI	**04**
	(c)	Draw the ITIC graph and explain its various regions.	**07**
Q.2	**(a)**	List out various applications of SVC	**03**
	(b)	Explain the concept of Grounding & Bonding	**04**
	(c)	Carry out comparative analysis of: TCR,TSC & STATCOM	**07**
		OR	
	(c)	With necessary diagram discuss about FC-TCR in detail. State its advantages and limitations.	**07**
Q.3	**(a)**	Define: Displacement, Distortion & True power factor.	**03**
	(b)	Explain the need of SVC in Traction System	**04**
	(c)	Discuss: Harmonics in Transformers.	**07**
		OR	
Q.3	**(a)**	Discuss K-factor rating for a transformer	**03**
	(b)	Discuss the term: Transient Stability margin. Explain its improvement using SVC.	**04**
	(c)	List out the undesirable effects of harmonics on various components.	**07**
Q.4	**(a)**	Enlist any 3 IEEE standards associated with Power Quality.	**03**
	(b)	Draw and explain the block diagram for an SVC automatic voltage regulator.	**04**
	(c)	Compare various aspects of Single Tuned filter with Damped filter	**07**
		OR	
Q.4	**(a)**	Define: Transients. Discuss its types and causes.	**03**
	(b)	Write a short note on Phase Locked Oscillator control system.	**04**
	(c)	Discuss in details the IEEE 519 and IEC 61000 series standards for Harmonics.	**07**
Q.5	**(a)**	Discuss in detail the need of site surveys in PQ monitoring.	**03**
	(b)	Discuss the role of data loggers and chart recorders in case of measurement of power quality	**04**
	(c)	Defining Flicker, enlist reasons for its causes and mitigation techniques.	**07**
		OR	
Q.5	**(a)**	Discuss the need of measuring Harmonic Voltage and Current.	**03**
	(b)	Explain the following terms: i) Point of Common Coupling ii) Short Circuit Ratio	**04**
	(c)	Write a note on Harmonic analyzer.	**07**

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