Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII EXAMINATION – WINTER 2025

Subject Code:3170921 Date:13-11-2025

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)**	Define: Voltage Sag, Voltage Swell, Over Voltage and Under Voltage	**03**
	(b)	What is grounding? Explain the role of grounding in terms of power quality.	**04**
	(c)	Explain different Static Var Compensators.	**07**
Q.2	**(a)**	Define momentary interruption and components of waveform distortion.	**03**
	(b)	Define harmonics. Differentiate inter harmonics and sub harmonics.	**04**
	(c)	Discuss about the Computer Business Equipment Manufacturer Association (CBEMA) curve. Explain the events described in the curve.	**07**
		OR	
	(c)	Discuss the effect of harmonics on transformers and derive expression for k factor.	**07**
Q.3	**(a)**	Write any three IEEE standards associated with power quality.	**03**
	(b)	List out different categories of load supplied by utilizers which are responsible for harmonics generation.	**04**
	(c)	Explain STATCOM with necessary diagrams. State its advantages and limitations.	**07**
		OR	
Q.3	**(a)**	List out the various instruments used in power quality measurements.	**03**
	(b)	Discuss the various applications of SVCs.	**04**
	(c)	Explain the control systems of SVC for reactive power control.	**07**
Q.4	**(a)**	State the importance of power factor in industry as per power quality study.	**03**
	(b)	Explain the concept of Grounding and Bonding.	**04**
	(c)	Define flicker. Also enlist the reasons for its causes and mitigation techniques.	**07**
		OR	
Q.4	**(a)**	Write the classification of filter circuits.	**03**
	(b)	Write short note on phase locked oscillator control system.	**04**
	(c)	Explain the operating principle of Pulse Width Modulation (PWM) for harmonics mitigation.	**07**
Q.5	**(a)**	Differentiate Static Var Compensator Systems versus Synchronous Condensers.	**03**
	(b)	What is THD? Explain the power quality standards for THD.	**04**
	(c)	Explain the types of FACTS controllers.	**07**
		OR	

Q.5	**(a)**	List out applications of SVCs for traction systems.	**03**
	(b)	Draw and explain the block diagram for an SVC automatic voltage regulator.	**04**
	(c)	Discuss the comparison considering various aspects of single tuned filter with damped filter.	**07**

****