Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170921 Date:17/12/2021

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.**

Q.1	**(a)**	Discuss the sources of voltage sag.	**03**
	(b)	Define flicker. List reasons responsible for flicker.	**04**
	(c)	What do you mean by term "power quality"? Discuss all the power quality issues in brief.	**07**
Q.2	**(a)**	What are the types of FACTS controllers?	**03**
	(b)	Explain single point and multi point grounding.	**04**
	(c)	Discuss harmonics in No-Load Exciting Current and Harmonics due to Inrush Current in transformer.	**07**
		OR	
	(c)	Discuss the effect of harmonics on AC Motors Drives.	**07**
Q.3	**(a)**	State the importance of power factor in industry as per power quality study.	**03**
	(b)	Discuss in brief, about the various applications of SVCs.	**04**
	(c)	Explain working of TSC- TCR with neat circuit diagram and waveform.	**07**
		OR	
Q.3	**(a)**	Explain application of synchronous condensers.	**03**
	(b)	Discuss in brief, about harmonics in a Thyristor-Controlled Reactor.	**04**
	(c)	Explain the schematic diagram and working principle of a STATCOM.	**07**
Q.4	**(a)**	What is THD? According to IEEE 519, state various voltage and current THD?	**03**
	(b)	Classify different types of harmonics filter.	**04**
	(c)	Mention the methods of passive reactive power compensation. Compare them with compensation using FACTS devices.	**07**
		OR	
Q.4	**(a)**	Write short note on true RMS meter.	**03**
	(b)	Write a note on harmonic analyzer.	**04**
	(c)	What are CBEMA and ITIC graphs? Draw and discuss the ITIC graph in detail.	**07**
Q.5	**(a)**	Define: 1.Linear Loads 2.Inrush Current 3.Voltage Swell	**03**
	(b)	Explain single-tuned filter for harmonic reduction.	**04**
	(c)	Describe the objectives and procedures for performing power quality monitoring.	**07**
		OR	
Q.5	**(a)**	What are the various instruments used for power quality measurements?	**03**
	(b)	Explain the features of flicker meters.	**04**
	(c)	Discuss the effect of harmonics on transformer and derive expression for k factor.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170921 Date:14/06/2022

Subject Name:Power Quality and FACTS

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)**	Define the term "Power Quality".	**03**
	(b)	Explain about Power Quality Standards Consider for Power Quality.	**04**
	(c)	Explain the all Power Quality Issues with necessary diagrams.	**07**
Q.2	**(a)**	Explain the role of Grounding in terms of Power Quality.	**03**
	(b)	Give the importance of FACTS controller for Power Quality.	**04**
	(c)	Explain the role of SVC device for Reactive Power Compensation with necessary diagrams.	**07**
		OR	
	(c)	Write Short Note on Reactive Power Compensation and Also explain the comparison of Series & Shunt Compensation.	**07**
Q.3	**(a)**	Explain the operation of single point and Multi Point Grounding.	**03**
	(b)	Explain the role of Harmonic Filters in Harmonics Mitigation.	**04**
	(c)	Explain the working of SVC device using TSC-TCR with necessary diagrams.	**07**
		OR	
Q.3	**(a)**	Explain the concept of Harmonics and its side effects in Power System.	**03**
	(b)	Explain the Applications of SVC and STATCOM devices.	**04**
	(c)	Explain the Operating Principle of STATCOM with Necessary Diagrams.	**07**
Q.4	**(a)**	Write a Short Note on Harmonic Analyzer.	**03**
	(b)	Prevention of Voltage Stability using SVC.	**04**
	(c)	Give the Comparison of DC Drives & AC Drives.	**07**
		OR	
Q.4	**(a)**	Explain the Harmonics Effects in 3-Phase Transformer.	**03**
	(b)	What is THD? Explain the Power Quality Standards for THD.	**04**
	(c)	Explain the operating principle of Pulse Width Modulation (PWM) for Harmonics Mitigation.	**07**

Q.5	**(a)**	Give the Differences Between IEEE 519-1992 And IEC 61000-Series Standards.	**03**
	(b)	Give the Difference between Shunt And Series Active Power Filter.	**04**
	(c)	Explain the working of RMS Meter and Flicker Meter with necessary diagrams.	**07**

OR

Q.5	**(a)**	List out of Various equipments used for Power Quality Measurements.	**03**
	(b)	Explain the role of Synchronous Condenser and Capacitor bank.	**04**
	(c)	Explain the Power Quality Monitoring Standards used in Power Quality.	**07**

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