Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3170906 Date:30-11-2024

Subject Name: Advanced Power Electronics

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)**	Explain fly back converter topology with diagram and wave forms.	**03**
	(b)	Define FACTS. Give classification of FACTS controllers.	**04**
	(c)	Explain operation of ZVS converter with diagram and wave forms.	**07**
Q.2	**(a)**	Classify the Resonant converter.	**03**
	(b)	What is the need of Resonant Converter? Compare Series Loaded Resonant (SLR) converter with Parallel loaded resonant (PLR) Converter.	**04**
	(c)	Derive the expression for duty ratio in continuous and discontinuous mode of operation for Buck -Boost converter with circuit diagram and waveform.	**07**
		OR	
	(c)	Discuss operation of Push pull converter type switched mode dc power supply along with necessary waveforms.	**07**
Q.3	**(a)**	Explain the concept and need of Multi Level inverter.	**03**
	(b)	Compare the three topologies of multilevel inverter	**04**
	(c)	Draw circuit diagram and wave forms of five level diode clamped inverter. Explain its working.	**07**
		OR	
Q.3	**(a)**	Explain operation of Cascaded H-bridge multilevel inverter	**03**
	(b)	State advantages and disadvantages of multi-pulse converters.	**04**
	(c)	Draw the transformer connections for 18 pulse converters. Explain Y-Z2 transformer connection used for multipulse converter	**07**
Q.4	**(a)**	Explain working principal of SSSC.	**03**
	(b)	Comparison of SVC & STATCOM.	**04**
	(c)	Explain operating principle of Unified power flow controller (UPFC).	**07**
		OR	
Q.4	**(a)**	Discuss need of phase shifting transformer.	**03**
	(b)	Explain the working of Fixed Capacitor Thyristor-Controlled Reactor (FC-TCR). Draw neat diagrams.	**04**
	(c)	Explain the working principle of TSC-TCR	**07**
Q.5	**(a)**	Explain different type of HVDC link.	**03**
	(b)	Draw the typical HVDC transmission scheme and explain the equipment's required for HVDC system	**04**
	(c)	Discuss sine PWM techniques used for multilevel inverter.	**07**
		OR	
Q.5	**(a)**	What is the difference between isolated and non-isolated dc power supply?	**03**
	(b)	What is phase angle compensation in transmission line?	**04**
	(c)	State the advantages HVDC transmission over EHVAC transmission for bulk power transmission	**07**

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