Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170906 Date:10-01-2023

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)**	Compare Linear voltage regulator and Switch mode voltage regulator with the help of block diagram.	**03**
	(b)	Explain full bridge converter. State its advantages over half bridge converter.	**04**
	(c)	Derive output equation for the buck-boost converter with necessary circuit diagram and waveform.	**07**
Q.2	**(a)**	Explain the working principle of resonant converter.	**03**
	(b)	Explain fly back converter.	**04**
	(c)	How the harmonic current are canceled by phase shifting transformer in 12 pulse rectifier? Explain with necessary schematic diagram.	**07**
		OR	
	(c)	Discuss the equipment required for HVDC systems	**07**
Q.3	**(a)**	Compare HVDC and HVAC transmission systems.	**03**
	(b)	Draw schematic diagram of Monopolar, Bipolar and Homopolar link.	**04**
	(c)	Draw the circuit diagram and waveform of five levels cascaded H – Bridge Multilevel Inverter and explain its working.	**07**
		OR	
Q.3	**(a)**	Give comparison of ZCS & ZVS resonant converter.	**03**
	(b)	Differentiate between continuous mode of conduction and discontinuous mode of conduction.	**04**
	(c)	Explain the working of one leg five levels diode clamped multilevel inverter with circuit diagram and waveform. Also mention its salient features.	**07**
Q.4	**(a)**	Why multi pulse converter is better than conventional converter?	**03**
	(b)	Explain the operation of Class E converter.	**04**
	(c)	Explain following transformer connection with phasor diagram used in multi pulse converter. (a) Y-Z1 (b) Δ-Z1	**07**
		OR	
Q.4	**(a)**	Compare Series Loaded Resonant (SLR) converter with Parallel loaded resonant (PLR) Converter.	**03**
	(b)	Define Flexible ac Transmission Systems (FACTS) with brief description.	**04**
	(c)	Explain operating principle of Unified power flow controller (UPFC).	**07**
Q.5	**(a)**	Discuss static characteristics of STATCOM	**03**
	(b)	State advantages and limitation of SSSC.	**04**
	(c)	Explain the working principle of TSC-TCR.	**07**

OR

Q.5	**(a)**	Compare SVC and STATCOM.	**03**
	(b)	What is series compensation? Discuss working of Thyristor controlled series capacitor (TCSC).	**04**
	(c)	Explain the working principle of FC-TCR	**07**

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