Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII EXAMINATION – WINTER 2025

Subject Code:3170906 Date:20-11-2025

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 switching voltage regulator with linear voltage regulator.	**03**
	(b)	Explain fly back converter.	**04**
	(c)	Describe Cuk converter with circuit diagram.	**07**
Q.2	**(a)**	Classify the Resonant converter.	**03**
	(b)	Compare ZVS-ZCS converter.	**04**
	(c)	Explain operation of ZVS converter with diagram and wave forms.	**07**
		OR	
	(c)	Derive the expression for duty ratio in discontinuous mode of operation with constant V_o for Buck converter with circuit diagram and waveform.	**07**
Q.3	**(a)**	Explain concept of multilevel inverter.	**03**
	(b)	State important advantages, disadvantages and applications of SMPS	**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)**	Explain half bridge converter.	**03**
	(b)	Compare the three topologies of multilevel inverter	**04**
	(c)	Explain working of Diode Clamped three level inverter.	**07**
Q.4	**(a)**	Discuss Equipment required for HVDC System and their significance	**03**
	(b)	Give Comparison of HVAC and HVDC transmission.	**04**
	(c)	Draw the transformer connections for 18 pulse converter. Explain Y-Z2 transformer connection used for multipulse converter.	**07**
		OR	
Q.4	**(a)**	Explain different type of HVDC link.	**03**
	(b)	Explain the all equipments required for HVDC system.	**04**
	(c)	Draw and explain bipolar HVDC power transmission system based on 12 pulse converters for each pole	**07**
Q.5	**(a)**	Explain operating principle of Unified power flow controller (UPFC).	**03**
	(b)	Give comparison of SVC and STATCOM.	**04**

	(c)	Discuss principle of series compensation. Explain operation of static synchronous series compensator (SSSC).	**07**

OR

Q.5	**(a)**	What is phase angle compensation in transmission line?	**03**
	(b)	Define FACTS. Give detail classification of FACTS controller.	**04**
	(c)	Discuss principle of shunt compensation. Explain operation of fixed capacitor- thyristors controlled reactor (FC-TCR)	**07**

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