Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170906 Date:22-05-2024

Subject Name:Advanced Power Electronics

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)**	Describe SEPIC converter with circuit diagram.	**03**
	(b)	Compare buck, boost and buck-boost converter with reference to technical parameters.	**04**
	(c)	Giving circuit diagram and showing waveforms, explain working of fly – back converter type switched mode DC power supply.	**07**
Q.2	**(a)**	Classify resonant pulse converter and discuss applications.	**03**
	(b)	Give comparison between Zero Voltage Switching and Zero Current Switching resonant converters.	**04**
	(c)	Discuss operation of parallel load resonant DC to DC converter.	**07**
		OR	
	(c)	Derive output equation for the buck–boost converter with necessary waveform.	**07**
Q.3	**(a)**	Explain the limitations of Multilevel inverter.	**03**
	(b)	Explain operation of Cascaded H-bridge multilevel inverter.	**04**
	(c)	Justify the sentence, “Space vector pulse width modulation technique is better than sine PWM technique”.	**07**
		OR	
Q.3	**(a)**	State the advantages of FACTS devices.	**03**
	(b)	Explain working principle of SSSC.	**04**
	(c)	Explain working of STATCOM with neat diagram. Also explain its static characteristic.	**07**
Q.4	**(a)**	Draw block diagram of HVDC transmission system.	**03**
	(b)	Write the advantages of resonance converter as compared to PWM converter.	**04**
	(c)	Draw the circuit diagram and waveform of 12 pulse converter and explain its working principle.	**07**
		OR	
Q.4	**(a)**	Differentiate between continuous mode of conduction and discontinuous mode of conduction.	**03**
	(b)	Explain the operation of Class E converter.	**04**
	(c)	Compare HVDC and HVAC transmission systems.	**07**
Q.5	**(a)**	Discuss the principle of series compensation.	**03**
	(b)	Explain the working of fixed capacitor thyristor-controlled reactor.	**04**

	(c)	Explain operating principle of Unified power flow controller.	**07**
		OR	
Q.5	**(a)**	State advantages and disadvantages of multi–pulse converters.	**03**
	(b)	Explain operation of diode clamped multilevel inverter.	**04**
	(c)	Draw the transformer connections for 18 pulse converters. Explain Y-Z2 transformer connection used for multi-pulse converter.	**07**

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