Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3170906 Date:08-12-2023

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)	With neat circuit diagram and waveform discuss class E resonant inverter.	**04**
	(c)	Discuss operation of Buck converter in continuous and discontinuous conduction mode.	**07**
Q.2	**(a)**	Draw schematic diagram of Monopolar, Bipolar and Homopolar link for HVDC system.	**03**
	(b)	Draw circuit diagram and waveforms of five level diode clamped inverter.	**04**
	(c)	Figure out the specifications/properties of a good power supply. Explain construction and working of Fly back converter type switched mode dc power supply.	**07**
		OR	
	(c)	Explain the forward converter with waveform. Derive its output voltage expression. Draw its circuit diagram and waveforms.	**07**
Q.3	**(a)**	Classify resonant pulse converter and discuss applications.	**03**
	(b)	Compare ZCS and ZVS.	**04**
	(c)	Draw circuit diagram and waveforms of five level flying capacitor inverter. Explain its working.	**07**
		OR	
Q.3	**(a)**	Draw circuit diagram and waveforms of Zero Voltage Switching Converter	**03**
	(b)	Write the advantages of resonance converter as compared to PWM converter	**04**
	(c)	Mention advantages of H bridge multilevel inverter. Explain working of five level H bridge inverter.	**07**
Q.4	**(a)**	State the types of HVDC systems and explain each in brief.	**03**
	(b)	Explain concept, advantages and limitations of multi-pulse converter.	**04**
	(c)	Explain the working principle of Thyristorised Controlled Reactor (TCR) with neat sketch.	**07**
		OR	
Q.4	**(a)**	Compare AC and HVDC power transmission systems.	**03**
	(b)	Draw the transformer connections for 18-pulse converter.	**04**
	(c)	Explain the working of three-phase Thyristor Controlled Reactor (TCR) with neat diagrams. How to reduce harmonics introduced by three phase TCR?	**07**

Q.5	**(a)**	Define FACTs systems and state its possible benefits in Emerging Transmission Network.	**03**
	(b)	Explain difference between multi pulse converter and multilevel converter with suitable diagram.	**04**
	(c)	Discuss principle of shunt compensation. Explain operation of fixed capacitor- thyristors controlled reactor.	**07**

OR

Q.5	**(a)**	State the need of reactive power compensation	**03**
	(b)	Explain Y-Z2 transformer connection used for multipulse converter.	**04**
	(c)	Explain the delta connected 3 phase-TCR with necessary diagram and waveforms.	**07**

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