Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3170906 Date:15/12/2021

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)**	With block diagram Compare Linear voltage regulator and Switch mode voltage regulator.	**03**
	(b)	Write the advantages of resonance converter as compared to PWM converter.	**04**
	(c)	Derive output equation for the buck-boost converter with necessary	**07**
Q.2	**(a)**	What is the need of Resonant Converter? Compare Series Loaded Resonant (SLR) converter with Parallel loaded resonant (PLR) Converter	**03**
	(b)	Differentiate between continuous mode of conduction and discontinuous mode of conduction.	**04**
	(c)	Justify the name of converter as zero voltage switching converter with necessary diagram and waveform.	**07**
		OR	
	(c)	Illustrate how the harmonic current are canceled by phase shifting transformer in 12 pulse rectifier.	**07**
Q.3	**(a)**	Compare the three topologies of multilevel inverter.	**03**
	(b)	What are the advantages of cascaded H bridge multi-level inverter over other two topologies?	**04**
	(c)	Explain the operation of zero voltage switching resonant converter with circuit diagram, waveform and required equation.	**07**
		OR	
Q.3	**(a)**	Compare zero voltage switching (ZVS) and zero current switching (ZCS) resonant converter.	**03**
	(b)	Explain the operation of Class E converter	**04**
	(c)	Explain the operation of 5-Level DCMLI. Also discuss problems associated with DCMLI and how it will overcome.	**07**
Q.4	**(a)**	Classification Of FACTS devices.	**03**
	(b)	Draw the one-line diagram of HVDC & Discuss the equipments of HVDC systems.	**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)**	State the need of reactive power compensation.	**03**
	(b)	Explain the working of Fixed Capacitor Thyristor-Controlled Reactor (FC-TCR). Draw neat diagrams.	**04**
	(c)	Discuss operation of five level flying capacitor multilevel inverter with neat circuit diagram and waveforms.	**07**
Q.5	**(a)**	Draw schematic diagram of Monopolar, Bipolar and Homopolar link.	**03**
	(b)	State advantages and limitation of SSSC.	**04**

	(c)	The class E resonance inverter operates at resonance and has Vs = 12 V, R= 10 Ω, fs = 25 kHz and Q = 7. Determine optimum value of L, C, Ce and Le.	**07**

OR

Q.5	**(a)**	Give classification and applications of phase shifting transformer.	**03**
	(b)	State advantages and limitation of SSSC.	**04**
	(c)	Discuss operation of Flyback converter. Draw its circuit diagram and waveforms.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170906 Date:08/06/2022

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)**	Give comparison between continuous conduction node and discontinuous conduction mode.	**03**
	(b)	Discuss static characteristics of SVC.	**04**
	(c)	Derive output equation for the buck-boost converter with necessary.	**07**
Q.2	**(a)**	Discuss multi output switch mode regulators.	**03**
	(b)	What is the need of Resonant Converter? Compare Series Loaded Resonant (SLR) converter with Parallel loaded resonant (PLR) Converter.	**04**
	(c)	Discuss discontinuous mode of operation in buck boost converter with waveforms.	**07**
		OR	
	(c)	Explain zero current switching dc-dc converter.	**07**
Q.3	**(a)**	Explain the concept & need of Multi Level Inverter (MLI)	**03**
	(b)	What are the advantages of cascaded H bridge multi-level inverter over other two topologies?	**04**
	(c)	Explain the operation of zero voltage switching resonant converter with circuit diagram, waveform and required equation.	**07**
		OR	
Q.3	**(a)**	Draw schematic diagram of 12 pulse converter with transformer connection.	**03**
	(b)	Discuss difference between series and shunt compensation.	**04**
	(c)	Discuss sine PWM techniques used for multilevel inverter.	**07**
Q.4	**(a)**	Classification Of FACTS devices.	**03**
	(b)	Discuss need of phase shifting transformer.	**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)**	Discuss static synchronous series compensator.	**03**
	(b)	Give comparison of HVAC and HVDC transmission.	**04**
	(c)	Explain the operation of six pulse diode rectifier with resistive load with necessary diagram and waveform.	**07**
Q.5	**(a)**	Explain working principal of SSSC.	**03**
	(b)	Comparison of SVC & STATCOM.	**04**
	(c)	Discuss operation of Flyback converter. Draw its circuit diagram and waveforms.	**07**

OR

Q.5	**(a)**	What is the need of Reactive Power Compensation?	**03**
	(b)	State advantages and limitation of SSSC.	**04**
	(c)	Explain operating principle of Unified power flow controller (UPFC).	**07**

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