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 V_s = 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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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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