Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. - SEMESTER–VIII EXAMINATION –Summer-2015

Subject code: 180907 **Date:05/05/2015**

Subject Name: Advanced Power Electronics-II

Time:10.30AM-01.00PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define SVG as per IEEE. Compare conventional reactive power compensators with thyristor based controllers (FACT).	**07**
	(b)	Compare EHV AC with HVDC transmission with reference to Economics of Transmission, Technical performance and Reliability. Draw relevant diagram.	**07**
Q.2	**(a)**	'When $I^2X_L=V^2/Xc$ for a particular load, such a load is known as SIL'. By using the above definition justify the role of SIL to maintain the stability and voltage in long transmission line where a line is energizing with high voltage. Draw the graph of variation of reactive power with different line loading (lightly load, natural load, heavily load).	**07**
	(b)	Mention important features and advantages of IGBT based HVDC-VSC transmission systems. Mention at least two applications of HVDC-VSC systems.	**07**
		OR	
	(b)	Explain shunt and series compensation with phasor diagrams. Mention careful design consideration while selecting the above compensation.	**07**
Q.3	**(a)**	Explain load compensation and system compensation with circuit diagram and phasor diagram.	**07**
	(b)	Write a short technical note on Emerging Transmission Network. Draw relevant diagram.	**07**
		OR	
Q.3	**(a)**	Explain TCR with circuit diagram. Draw current and voltage waveforms for different values of α.	**07**
	(b)	Draw TSC configuration. Explain turning Off of TSC valve with V-I waveforms.	**07**
Q.4	**(a)**	Define delay angle (α), overlap angle (μ), and extinction angle (γ), angle of advance (β), commutating voltage and commutating reactance.	**07**
	(b)	Explain 6-pulse inverter operation with overlap. Explain it with waveform only.	**07**
		OR	
Q.4	**(a)**	State the differences in power control in HVDC and HVAC systems and explain the necessity of power control in an HVDC link.	**07**
	(b)	Explain the necessity of compounding both rectifier and inverter stations with constant current control.	**07**
Q.5	**(a)**	Compare technical performance of different SVCs.	**07**
	(b)	Compare classical HVDC and HCDC-VSC systems.	**07**
		OR	

Q.5	**(a)**	Give a neat sketch of different HVDC links. Which HVDC link is commonly used? What is the advantage of using Homopolar link? Mention at least one HVDC schemes in India with voltage and power capacity.	**07**
	(b)	Classify basic types of FACT controllers with symbolic diagram. Mention possible benefits from FACT technology.	**07**

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