Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII EXAMINATION – SUMMER 2016

Subject Code:180907 **Date:16/05/2016**

Subject Name:Advanced Power Electronics II (Department Elective - II)

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.**

Q.1	**(a)**	Derive the equation of instantaneous power and define active and reactive power from it.	**07**
	(b)	Explain the Graetz circuit with necessary diagram and also obtain the expression of output voltage.	**07**
Q.2	**(a)**	Explain load compensation and system compensation with the help of phasor diagram.	**07**
	(b)	State & discuss the factors to be given due care while designing the Shunt & Series compensators.	**07**
		OR	
	(b)	Draw schematic diagram of Bipolar HVDC transmission system and explain working of each component in brief.	**07**
Q.3	**(a)**	In view of reactive power control, explain working of synchronous condensers with schematic diagram.	**07**
	(b)	Compare various kinds of SVC devices.	**07**
		OR	
Q.3	**(a)**	Explain the working of three-phase Thyristor Controlled Reactor (TCR) with neat diagrams. How to reduce harmonics introduced by three phase TCR?	**07**
	(b)	Explain different types of HVDC systems.	**07**
Q.4	**(a)**	Derive the equation for rating of series and shunt compensator. Compare rating of Series & Shunt Compensator.	**07**
	(b)	Explain working of 12 pulse converter with suitable circuit diagram and waveforms. State its advantages over 6-pulse converter.	**07**
		OR	
Q.4	**(a)**	Give comparison between CSC (Classical HVDC) and HVDC-VSC systems.	**07**
	(b)	Explain the effect of source inductance on converter output voltage. Also obtain expression of DC output voltage with overlap angle.	**07**
Q.5	**(a)**	Discuss advantages and disadvantages of HVDC system over HVAC system.	**07**
	(b)	Develop the complete equivalent circuit of an HVDC link and obtain the expression for the dc current in DC link as $I_d = V_{d0r} - V_{d0i} / R_{eq.}$	**07**
		OR	
Q.5	**(a)**	How compounding of rectifiers can be done? Explain current compounding of an inverter.	**07**
	(b)	Explain Inverter Extinction Angle Control.	**07**

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