Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-VII Examination-Nov/Dec.-2011

Subject code: 170905 **Date: 29/11/2011**

Subject Name: Advance power system- I

Time: 10.30 am-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)**	Explain different methods of Reactive power control.	**07**
	(b)	Discuss advantages of FACTS.	**07**
Q.2	**(a)**	Explain working of STATCOM with schematic diagram.	**07**
	(b)	Compare HVDC and EHVAC transmission system	**07**
		OR	
	(b)	Explain UPFC control with neat schematic diagram.	**07**
Q.3	**(a)**	Explain schematic diagram of HVDC substation and explain working of each component in brief.	**07**
	(b)	What is a HVDC-VSC system? Give single line diagram of the system.	**07**
		OR	
Q.3	**(a)**	For a lossless distributed parameter symmetrical line derive the equation for the midpoint voltage on the line in terms of wave number and surge impedance of the line. Also draw graph for the voltage distribution ,midpoint voltage v and load angle δ.	**07**
	(b)	Explain working of TCR draw wave forms of voltage and current for different values of α.	**07**
Q.4	**(a)**	Identify the various sources for generation of harmonics in HVDC system. Discuss various adverse effects caused due to the presence of harmonics.	**07**
	(b)	Comparison between the classical HVDC and HVDC-VSC system.	**07**
		OR	
Q.4	**(a)**	Give schematic diagram of 12 pulse converter. Explain different conduction modes.	**07**
	(b)	State difference in power control in HVDC and HVAC system. Explain the necessity of power control in an HVDC link.	**07**
Q.5	**(a)**	With relevant diagram explain operation of IPC schemes employed in control schemes of firing circuit of HVDC station. Explain operation of cosine control of phase delay used in above schemes.	**07**
	(b)	Explain extinction angle control? What are its limitations under asymmetrical fault?	**07**
		OR	
Q.5	**(a)**	What is IGBT? Draw its symbol and discuss important features of IGBT. List reason for selection of IGBT for VSC based HVDC conversion.	**07**
	(b)	Sketch the current waveform of the transformer secondary line current of a 12 pulse converter. Derive expressions for PIV and PPR for 12 pulse converter.	**07**

****