

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (Old) EXAMINATION – WINTER 2019

Subject Code: 170905

Date: 23/11/2019

Subject Name: Advanced Power System - I

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.

		Marks
Q.1	(a) Classify FACTS devices and enlist the advantages of FACTS devices.	07
	(b) Explain various types of links used in HVDC systems with necessary diagrams.	07
Q.2	(a) Explain effect of shunt compensation and series compensation on power transfer capacity of transmission line.	07
	(b) Explain conventional methods of real power control in the transmission line.	07
	OR	
	(b) Discuss in brief various sources and sinks of reactive power in power system.	07
Q.3	(a) For a lossless distributed parameters lines, derive the below equation of power flow from sending end to receiving end.	07
	$P = \frac{V_s V_R \sin \delta}{Z_0 \sin \beta a}$	
	(b) Discuss the advantages of HVDC systems.	07
	OR	
Q.3	(a) Explain the operating characteristics of saturated reactor with schematic diagram.	07
	(b) What is synchronous condenser? Discuss its application.	07
Q.4	(a) Explain the application of various apparatus required for HVDC substation with neat schematic diagram.	07
	(b) Discuss the operating characteristic of IGBT. Explain the advantages of IGBT over SCR for HVDC converter.	07
	OR	
Q.4	(a) Discuss features, advantages and application of an HVDC-VSC system with single line diagram.	07
	(b) Explain working of 6 pulse converter.	07
Q.5	(a) Explain operating characteristics of TCR.	07
	(b) Explain the causes and consequences of harmonics in HVDC system.	07
	OR	
Q.5	(a) Prove that power transmitted by bipolar DC line is same as that of 3 – phase AC line with necessary assumptions.	07
	(b) Explain extinction angle control. What are its limitations under asymmetrical fault?	07
