

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (Old) EXAMINATION – WINTER 2019****Subject Code: 180907****Date: 29/11/2019****Subject Name: Advanced Power Electronics -II****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.

- Q.1** (a) Discuss the merits and demerits of the HVDC transmission line over HVAC transmission line. **07**
- (b) What is FACTS? Discuss the advantages of FACTS in brief. **07**
- Q.2** (a) Critically compare different SVCs on various aspects. **07**
- (b) Derive the equation showing effect of series compensation on power transfer capability of transmission line. State advantages and limitations of series compensation over shunt compensation. **07**
- OR**
- (b) State and discuss the factors to be given due care while designing the shunt and series compensators. **07**
- Q.3** (a) Explain working of TCR. Derive the expression for susceptance of TCR. **07**
- (b) What is SIL? What is its significance? Also, draw the graph of variation of reactive power and voltage variation over the line with different line loading (lightly loading, normal loading, heavy loading). **07**
- OR**
- Q.3** (a) Explain the working of TSC-TCR compensator with relevant circuit, waveforms and characteristics. **07**
- (b) Derive the equation of PIV, peak to peak ripple and valve's volt-ampere rating for a 6-pulse Graetz's converter circuit. **07**
- Q.4** (a) State the difference in power control in HVDC and HVAC systems. Also, discuss the necessity of power control in an HVDC link. **07**
- (b) Explain the effect of overlap angle (μ) when VSC is operating as a rectifier. **07**
- OR**
- Q.4** (a) Draw the typical HVDC transmission scheme and discuss the function of equipment required for HVDC system. **07**
- (b) Explain the necessity of compounding both converter and inverter stations with constant current control. **07**
- Q.5** (a) With relevant diagrams/waveforms present the analysis for a 12 pulse converter used for HVDC system. **07**
- (b) Explain midpoint compensation with necessary derivation. **07**
- OR**
- Q.5** (a) List the types of HVDC system and explain each in brief. **07**
- (b) In context to HVDC converters, explain the inverter extinction angle control. **07**
