

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – VII • EXAMINATION – WINTER 2012****Subject code: 170905****Date: 28/12/2012****Subject Name: Advanced Power System-I (Department Elective –I)****Time: 10.30 am - 01.00 pm****Total Marks: 70****Instructions:**

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

Q.1 (a) Compare EHVAC and HVDC transmission system. What are the standard rated voltages for HVDC and EHVAC systems? **07**

(b) What are the advantages offered by FACTS devices? What are the emerging trends in transmission networks? **07**

Q.2 (a) What is the requirement of reactive power in a transmission system? Compare series and shunt compensation. **07**

(b) Calculate the secondary line voltage of the transformer 3-phase bridge rectifier to provide a DC voltage of 100kV. Assume $\alpha = 30^\circ$ and $\mu = 15^\circ$. What is effective reactance X_L , if the rectifier gives 600A of DC output current **07**

OR

(b) If V_g-I_g characteristics of an SCR is assumed to be a straight line passing through the origin, with a gradient of 3×10^{-3} . Calculate the required gate source resistance, given that $E_g = 10V$ and allowable gate power dissipation is 0.012W. **07**

Q.3 (a) What is synchronous condenser? What are its applications? Compare synchronous condenser and static capacitor for reactive power compensation. **07**

(b) What is TSC-TCR? How can it be differentiated from FC-TCR? Explain operating characteristics of TSC-TCR. **07**

OR

Q.3 (a) A bipolar two terminal HVDC link is delivering 1000MW at $\pm 500kV$ at the receiving end. The total losses in the DC circuit are 40MW. Calculate (1) Sending end voltage (2) Voltage at mid point (3) Total resistance of DC circuit. **07**

(b) Compare different SVCs. **07**

Q.4 (a) What are the equipments required in HVDC system? Discuss the reliability aspect of HVDC system. **07**

(b) What is AGC? How primary and secondary control in AGC works? Also explain transformer tap changer control. **07**

OR

Q.4 (a) What is the principle of HVDC voltage source converter? Explain in detail with relevant diagrams **07**

Q.4 (b) Explain conduction sequence in 6-pulse converter configuration. **07**

Q.5 (a) Analyze 12-pulse converter. **07**

(b) How compounding of rectifiers can be done? Explain current compounding of an inverter. **07**

OR

Q.5 (a) What is the importance of harmonic study in HVDC system? How the harmonics are generated by transformers and converters? **07**

(b) What are the requirements of an ideal control system for HVDC link? Draw and explain the diagram of hierarchical control scheme for a HVDC link. **07**
