

(3 Hours)

[Total Marks - 80]

1. **Question No.1 is Compulsory**
2. Answer any three out of remaining five questions
3. Assume any suitable data wherever necessary and justify the same
4. Illustrate answer with sketches wherever required

Q1. Answer **all** questions

- a. State five comparisons between SVC and STATCOM. 05
- b. Write a short note on ideal load compensator? 05
- c. What are the objectives of series compensation? 05
- d. Explain in brief the basic types of FACTS controllers? 05

- Q2 a. Show that voltage sensitivity for load reactive power is  $\frac{dv}{dq} = \frac{-E/SSC}{1+kr^{(E/SSC)}}$  10
- b. Explain the shunt compensation by synchronous voltage source with the help of necessary diagram 10

- Q3 a. Explain in detail the methods of improving power factor in single phase AC system 10
- b. Explain variable impedance type series compensation (TSSC). 10

- Q4 a. Explain the Fixed Capacitor Thyristor controlled Reactor (FC-TCR) in detail along with operating VI characteristics 10
- b. Explain the Thyristor Controlled Phase Angle Regulator (TCPAR). 10

- Q5 a. Explain power flow through mesh transmission line with suitable example in details 10
- b. Explain switching converter type series compensation (SSSC) 10

- Q6 a. Explain the operating principle of Unified Power Flow Controller (UPFC) with relevant diagrams 10
- b. Explain the Thyristor Controlled Reactor (TCR) in detail & state the condition to obtain Thyristor Switched Reactor (TSR) from it 10