Roll No. .....

National Institute of Technology Delhi

Name of examination: B. Tech 4th Year (End-semester)

Branch : EEE Semester: 7

Title of Course : HVDC & Flexible AC Transmission Systems **Subject Code:** EE-402

Time: 3 Hours Marks: 50

Note:

1. **All sections are compulsory**
2. **Assume any data suitably if found missing**

(Section-I)

Q.1- Answer/comment on the following terms: (10)

i. Surge Impedance
ii. Objective of shunt compensation
iii. Practical Limitation of FACTS controllers
iv. Compare STATCOM and SVC.
v. Turn off device with examples
vi. Conduction angle
vii. SSR
viii. A-margin
ix. Practical Power-angle curve in SVC compensated T-line
x. Synchronous condenser

(Section-II)

Note: Attempt any FOUR

Q.2- Find the expression for voltage variation and reactive power required at the mid-point of symmetrical line w.r.t. SIL of line. (5)

Q.3- Specify the various applications of SVC in power system. (5)

Q.4- Clearly discus the dynamic characteristics of SVC and light the various advantages of dynamic slope. (5)

Q.5- What are the different modes of TCSC operation? Find the expression for equivalent impedance of TCSC. (5)

Q.6- Elaborate the various closed-loop control strategies of TCSC. (5)

(Section-III)

Note: Attempt any TWO

Q.7- (a) Explain following series compensated device with V-I characteristics: (5)

i. GCSC

ii. TSSC

(b) Define and compare VSC and CSC. (5)

Q.8- (a) Define the principal and working of following compensators with well-ordered figures:

i. SSSC

ii. STATCOM (5)

(b) What are the various features of UPFC? Clearly define the working and modes of UPFC. Why it is called Universal compensator? (5)

Q. 9- (a) Compare the performance of AC and DC transmission under various factors like economic, technical and reliability issues. (5)

(b) Describe different type of converter faults which occur in HVDC converter station. (5)