Roll No. .....

National Institute of Technology Delhi

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

Branch : EEE Semester: 7
Title of Course : HVDC & Flexible AC Transmission Systems Subject Code: EE-402
Time: 2 Hours Marks: 30

Note:

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

Q.1- What is FACTS? Why it is called flexible? Define different FACTS controllers w.r.t. power flow equation. (3)

Q.2- Define the concept of reactive power in power system. How loading affects the voltage of transmission system? (4)

Q.3- Define the following terms. (4)

i. Load Compensation

ii. System Compensation.

Q.4- Compare the capability of series and shunt compensation in case of mid-point compensated transmission line with respect to VAr rating of compensators. (5)

Q.5- A 735 kV, 800 km long symmetrical lossless line having following parameters:

i. $l = 0.932$ mh/Km

ii. $c = 12.2$ nF/km

iii. Load angle = 30°

Calculate:

a) Surge Impedance

b) SIL

c) Power Flow

d) Reactive power to maintain mid-point voltage at 1.05 pu. (4)

Q.5- What are the constraints of switching a TSC. Elaborate the switching strategy of TSC. (5)

Q.6- What is SVC? Discuss the dynamic and steady state characteristics of SVC. (5)