Registration No : | | | | | | | | | | |

Total Number of Page : 01 **M.Tech**
PPPE201

2nd Semester Back Examination 2017-18
HVDC & FACTS
BRANCH : POWER ELECTRO AND POWER SYSTEMS
Time : 3 Hours
Max Marks : 70
Q.CODE : C1095
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1 **Answer the following questions :** **(2 x 10)**

a) Show the variation of voltage along the line with load for HVDC Transmission and ac transmission.
b) What is surge impedance loading?
c) Give the equivalent circuit of the inverter based on the angle of advance (β).
d) Explain about Voltage Dependent Current Order Limit.
e) What are the different types of MTDC systems used?
f) Compare single phase ac line with monopolar dc line for power transfer capability.
g) Injecting voltage in series with the line can provide a powerful means of controlling the active and reactive power flow.Justify.
h) What are different categories of FACTS controllers?
i) What is sub synchronous resonance?
j) Give the amplitude variation of the fundamental TCR current with delay angle α.

Q2 **a)** What are different components of HVDC system? Explain the purpose of each. **(5)**
b) Compare the insulation level of a bipolar DC line with three phase AC line for same power transmission and equal losses. **(5)**

Q3 Describe Two and Three valve operation mode of a three phase Converter with delay angle α and overlap angle μ. **(10)**

Q4 Shows that the harmonics contain in the current waveforms of converter transformer are of the order$np \pm 1$. **(10)**

Q5 **a)** Explain the firing angle control for the valve in a converter. **(5)**
b) What are the different type of fault occurs in a converter? **(5)**

Q6 **a)** Derive the transfer function of SVC. **(5)**
b) How series compensation helps in voltage stability. **(5)**

Q7 **(a)** Give the operating principle of TSSC. **(5)**
(b) Explain the operating control scheme for GCSC. **(5)**

Q8 **Write short notes on any TWO :** **(5 x 2)**

a) Voltage Dependent Current Order Limit (VDCOL)
b) 12-pulse converter
c) Power oscillation damping
d) UPFC