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

Total Number of Pages : 01 **M.Tech**

EEPE201

2nd Semester Back Examination 2018-19
HVDC TRANSMISSION & FACTS
BRANCH : POWER SYSTEM ENGG
Time : 3 Hours
Max Marks : 70
Q.CODE : F315

Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

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

a) State the advantages of HVDC transmission?
b) What is the function of smoothing reactor?
c) Mention two applications of DC breakers?
d) Which factors limit the transmission capacity of lines?
e) What are the advantages of IPFC over UPFC?
f) How the dynamic stability conditions affect the power flow in a power system?
g) Compare the series and shunt compensation?
h) Mention the advantages of STATCOM?
i) What is sub-synchronous resonance?
j) What are the advantages of TSC-TCR type SVC over FC-TCR type SVC?

Q2 **a)** With neat diagram, explain different kinds of DC links. Explain the necessity of back to back HVDC link? **(5)**

b) With relevant waveform, derive the expression for average DC voltage in bridge converter with an overlap of less than 60 degree? **(5)**

Q3 **a)** Briefly explain with neat sketch Thyristor controlled reactor (TCR)? **(5)**

b) What is basic principle of TCSC? Explain the different modes of operation in TCSC? **(5)**

Q4 **a)** Describe the working principle of the two types of Static Var Compensators with schematic diagrams? **(5)**

b) Describe with the help of neat diagram & wave forms, the operation of 6 pulse bridge converter with delay angle α and without overlap. Derive the expressions for its dc voltage stating the assumptions mode. **(5)**

Q5 **a)** With the help of 5 modes, explain the characteristics of a twelve pulse converter. **(5)**

b) Explain in detail about the role of SVC in enhancing the steady state power limit and power system damping? **(5)**

Q6 'Best converter circuit for HVDC transmission is 3-phase bridge'. Justify the statement by explaining the advantages of a three phase Graetz bridge configuration. **(10)**

Q7 Compare HVDC and HVAC transmission for economics of operation, stability limits, voltage control and reliability. **(10)**

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

a) DC circuit breaker
b) MTDC system
c) SSSC