Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **M.TECH**
EEPE201

2nd Semester Back Examination – 2016-17
HVDC Transmission& FACTS
BRANCH(S):, ELECTRI & ELECTRO ENGG (POWER SYSTEM ENGG), ELECTRICAL POWER SYSTEM, POWER ELECTRO, POWER ELECTRO & DRIVES, POWER ELECTRO AND ELECTRICAL NG
Time: 3 Hours
Max marks: 70
QCode:Z1195

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) What are the methods by which power handling capability of transmission line can be enhanced to its thermal limit,
b) Mention the factors to be considered for during planning of HVDC transmission?
c) Define twelve pulse converter with schematic diagram.
d) State the techniques for harmonic elimination.
e) Explain how GCSC & TCR are duals of each other.
f) Explain, how will you protect against dc line faults?
g) What are the criteria for selection of valves for the converter used in HVDC transmission system.
h) State the efficiency of converter transformer. Give the optimum value for transformer supplying 6 pulse converter.
i) Give a basic two-converter scheme for IPFC.
j) Draw schematics for a converter station with proper labeling.

Q2 a) Explain the individual characteristics of a rectifier and an inverter with sketches. (5)

b) What are the requirements of reactive power in steady state? (5)

Q3 What is the reason for using star-star and star-delta transformer configurations for 12 pulse converter. Derive an equation for primary current using Fourier analysis (10)

Q4 a) A double circuit 3-phase line is converted into 3 circuit D.C homo polar line by bundling the conductors in the later. Compare the power transfer capacity of each circuit. Assume that the insulation levels and percentage line losses are same in both the circuits (5)

b) Explain, how TCBR is used to improve the transient stability. (5)

Q5 a) What is meant by pulse number, Extinction angle, Delay angle? (5)

b) What is the importance of storage in case of converter based FACTS devices? (5)

Q6 a) Explain the effect of firing angle errors on non-characteristic harmonics (7)
b) The operation of STATCOM is based on the operation of syn. m/c as rotating syn. Condenser. Justify. (5)

Q7 a) Explain how frequency control can be used for DC power modulation? (7)
b) List type of converters are generally used in FACTS devices. (3)

Q8
a) Explain the fault clearing process in HVDC poles. Explain how are the HVDCequipment protected against prolonged short circuit currents though there is no HVDC circuit breaker on HVDC pole side. (6)
b) Explain the effect of injected voltage in quadrature with the line current on the control of power flow in aline. (4)