

Roll No

MEPE-302(B)**M.E./M.Tech., III Semester Examination, December 2017****EHV AC and DC Transmission****(Elective-II)****Time : Three Hours****Maximum Marks : 70**

Note : i) Attempt any five questions. From the **Three** options (a, b, c) attempt any **Two** from each question.

ii) All questions carry equal marks.

1. a) Compare the power transfer and reactive power flow in EHV AC and HVDC transmission system.
 b) Derive and draw the wave forms of output voltage, transformer secondary current and valve voltage of a 3-phase, 6-pulse Graetz's circuit when the delay angle is 60° and take $\mu=0^\circ$.
 c) A bridge connected rectifier is fed from 220kV/110kV transformer with primary connected to 220kV. Determine the D.C. output voltage when the commutation angle is 15° and the delay angle is 45° .
2. a) Explain the operation of SVC. How can it be used for improving the voltage profile of transmission lines?
 b) Discuss problems associated with long EHV AC lines. Why is line compensation required?
 c) Discuss the benefits of FACTS technology. <http://www.rgpvonline.com>
3. a) Explain various types of Multi-terminal HVDC systems. Discuss their advantages.
 b) What is Ground returns? Explain the problems associated with the use of ground on return conductor.
 c) A 6-pulse bridge inverter is fed from 500kV DC voltage. Find the AC voltage output of the inverter if delay angle is 160° and commutation angle is 5° .
4. a) Explain the operation of SVC. How can it be used for improving the voltage profile of transmission lines?
 b) Discuss problems associated with long EHV AC lines. Why is line compensation required?
 c) Discuss the benefits of FACTS technology.
5. a) Draw the complete converter control characteristics in V_d-I_d plane. Show how these characteristics will change when the direction of power flow is reversed.
 b) Discuss in brief the problems associated with the parallel operation of EHV AC and DC systems.
 c) List the basic objectives of HVDC control system. Explain constant extinction angle control technique.
6. a) Discuss the size of filter and minimum cost of filters in HVDC station.
 b) Discuss reactive power requirement of HVDC converters and how it is supplied?
 c) In a HVDC link the DC current is 1kA and the rectifier end DC voltage is 500kV. Find the commutation reactance if the rectifier AC voltage is 400kV. Delay angle is 15° .
7. a) Discuss desired features of control of HVDC system.
 b) With the help of neat diagram of 3- ϕ , 6-pulse HVDC voltage for $\alpha=60^\circ$ and 90° . Discuss why 3- ϕ , 12-pulse converters are used in HVDC system. How 12-pulse output is achieved?
 c) Compare the desired features of constant current control and ignition angle control of converters.
8. a) Explain the kinds of DC links with their characteristics.
 b) Explain various types of AC transmission system and compare them.
 c) Discuss the limitations of HVDC transmission system.
