M.Tech. 1st Semester

Examination, December–2018

ELECTRICAL POWER SYSTEMS

Paper– MTEPS–102

HVDC Transmission

Time allowed : 3 hours] *[Maximum marks : 100*

***Note:** Attempt any **five** questions.*

1. (a) Discuss the different factors that favour HVDC transmission system over EHV transmission over long distances. 10

   (b) Describe power handling capability of HVDC lines. 10

2. (a) Discuss the HVDC static power converter with 12-pulse configuration. 10

   (b) A transformer secondary line voltage to a 3-phase bridge converter rectifier is 38 KV (i.e., $E_{L\text{-}L} = 38$ KV). Calculate the gross voltage output, when the overlap and commutation angle is 15° of delay angle is (a) 0°, (b) 15°, (c) 30°, (d) 45°

3. What do you understand by characteristic harmonics in HVDC System? Using Fourier analysis obtain equation for primary current of transformers connected to 12 pulse converter.. 20

4. (a) Discuss about various types of AC filter which will be employed for a HVDC link. 10

(b) Explain the effect of overlap angle on the performance of converter circuit. 10

5. (a) Describe the harmonic instability problem and voltage interaction between HVAC and DC system. 10

(b) Explain briefly about different types of HVDC links. 10

6. What are the different harmonics generated in voltage and current wave form on both AC and DC side in case of a 6 pulse converter? 20

7. (a) What are the source for over voltage's in HVDC system? How are they controlled? 10

(b) Discuss the need for circuit breakers in HVDC links. 10

8. What are different converter faults in HVDC system? Describe their protection also. 20