Hall Ticket No | | | | | | | | | | | Question Paper Code: AEEB43

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - FEBRUARY 2022
Regulation: R18

HVDC TRANSMISSION

Time: 3 Hours **(EEE)** **Max Marks: 70**

Answer FIVE Questions choosing ONE question from each module
(NOTE: Provision is given to answer TWO questions from any ONE module)
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) With neat sketches explain the different kinds of DC links available. List out its merits and demerits. **[7M]**

   (b) Explain the comparison of AC and DC transmission in detail with reference to
   i) Economics
   ii) Technical performance
   iii) Reliability. **[7M]**

2. (a) Compare the performance of EHVAC link with HVDC link for
   i) Equal voltage (insulation level) ii) Equal power loss **[7M]**

   (b) Explain clearly what do you understand by surge impedance loading? How a voltage profile of AC line is governed by load and length of the line? **[7M]**

MODULE – II

3. (a) Explain circuit configuration for typical 6-pulse and 12 pulse converters? Discuss the advantages and limitations for 12 pulse converter configurations. **[7M]**

   (b) What is meant by pulse number of a converter? Explain the individual characteristics of a rectifier and an inverter with sketch. **[7M]**

4. (a) Derive the expression for input power, output power and power factor of 6-pulse bridge converter with delay angle α. Assume there is no overlap. **[7M]**

   (b) With neat diagrams explain about single phase and 3 phase pulse width modulation techniques in HVDC systems. **[7M]**

MODULE – III

5. (a) Explain the role of shunt capacitor and synchronous condensers in reactive power control of HVDC systems. **[7M]**

   (b) What are the basic characteristics of converter control? Draw and explain combined characteristics of rectifier and an inverter. **[7M]**

6. (a) Explain the working of band pass and high pass filters used in HVDC systems.Describe the term detuning and state its importance in the design of filters for HVDC systems. **[7M]**

   (b) With neat diagram explain basic concepts of DC circuit interruption. Discuss the characteristics of DC circuit breakers. **[7M]**

MODULE – IV

7. (a) Write a short note on synchronous and asynchronous links in power modulation of HVDC systems. **[7M]**

   (b) With the help of neat diagram and characteristic waveforms explain voltage stability analysis in AC/DC systems. **[7M]**.

8. (a) What is transient stability and steady state stability? Write beifly about voltage stability and frequency stability. **[7M]**

   (b) Explain about power modulation for low frequency oscillations and also explain about reactive power modulation. **[7M]**

MODULE – V

9. (a) What is MTDC system and what are the major additions that could be made to it? Explain the working of modular multi level DC system. **[7M]**

   (b) Write about modular multi level converters in HVDC system. What are the advantages of multi-terminal DC links? **[7M]**

10. (a) Explain with a neat sketch the parallel operation of MTDC system. Draw the VI characteristics under steady state operation. **[7M]**

    (b) What are the types of parallel MTDC system. Give the comparison between series and parallel MTDC systems. **[7M]**

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