

VALLIAMMAI ENGINEERING COLLEGE
KATANKULATHUR-603203

PS7005 HIGH VOLTAGE DIRECT CURRENT TRANSMISSION

SEM: 3RD SEM PG PSE QUESTION BANK

UNIT-1

2 Mark

1. Name the HVDC transmission in india?
2. What are the limitations of EHVAC transmission?
3. Draw the cost vs distance curve of ac and dc transmission?
4. Write the expression for real power flow through the line?
5. What are the types of dc links?
6. What is converter station?
7. Draw the variation of voltage along the transmission line during different loading condition?
8. What is surge impedance loading?
9. What are the advantages of hvdc transmission system?
10. What are the disadvantages of hvdc transmission system?
11. What are the different between conventional transformer and converter transformer?
12. What are the applications of hvdc transmission system?
13. What is meant by multi terminal dc link?
14. What are the use of filters used at converter station?
15. What are the use of reactive power source at converter station?
16. What is asynchronous tie?
17. What is short circuit ratio?

16 Mark

1. Compare ehvac and hvdc transmission?
2. Explain the limitation of ehvac system?
3. Explain the different types of hvdc link?
4. Explain the application of hvdc transmission system?
5. Explain the planning for hvdc transmission system?
6. Explain the modern trends in dc transmission?

7. Draw a typical hvdc layout and explain their basic components?

UNIT-2

2 mark

1. What is Graetz circuit?
2. Define pulse number?
3. Define valve rating?
4. What is PIV?
5. Give the typical converter transformer rating for aHVDC transmission system?
6. What are the assumptions made to simplify the analysis of Graetz circuit?
7. Write down the average dc voltage of Graetz circuit without overlap?
8. Write down the converter bridge characteristics?
9. Explain the term delay angle and its significance in rectifier control.
10. What is commutation voltage of valves?
11. Explain the term angle of advance and its significance in inverter control.
12. Why the delay angle and extinction angles are to be maintained to minimum value.
13. Explain overlap angle and extinction angle.
14. Draw single and double tuned filters and its characteristics.
15. What are the different types of modes of operation of rectifier?

16 Mark

1. Explain with the help of neat diagram and wave forms, the operation of 6-pulse bridge converter with delay angle α and without overlap angle. Derive the expression for its dc output voltage, stating the assumptions made.
2. Explain with the help of neat diagram and wave forms, the operation of 6-pulse bridge converter with delay angle α and overlap angle u . derive the expression for its dc output voltage.
3. Deduce the complete equivalent circuit of rectifier & inverter and draw their characteristics.
4. 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.
5. Sketch the output dc voltage waveform and voltage across any one valve for 6-pulse bridge converter for the following two cases,
 - (i) delay angle $\alpha=30$ degree and overlap angle $u=5$ degree.
 - (ii) angle of advance $\beta=30$ degree and overlap angle $u=5$ degree.
6. Explain in detail the principle of DC Link control.
7. Explain the system control hierarchy.
8. Explain firing angle control & current and extinction angle control.

UNIT-3

2 Mark

1. What is MTDC system?
2. Why are multiterminal DC systems needed
3. What are the potential applications of MTDC systems?
4. What are different types of MTDC systems used?
5. What are different types of MTDC system controls?
6. What are the drawbacks in voltage limiting control in MTDC systems?
7. Draw the bulk power transmission using 2 terminal links diagram.
8. Can we extend the two terminal system to multi terminal system?
9. The detection of faults gets complicated in a mesh system. Discuss.
10. What is a multilevel VSC DC system?

16 mark

1. Explain in detail the types of MTDC systems. Compare series and parallel MTDC systems.
2. Explain the control and protection of MTDC systems.
3. Explain in detail the potential application and study of MTDC systems.
4. Discuss the different types of MTDC systems with neat diagram.
5. In case of failure in communication system, how you will control and protect MTDC system?
6. Explain the various methods of control in MTDC systems.
7. How power sharing and power control is achieved in an MTDC system?
8. How is current order control done in MTDC systems?
9. How is (a) paralleling (b) deparalleling and (c) control of power done in MTDC system?

UNIT-4

2 Mark

1. Write the different types of AC/DC power flow.
2. What is unified method of DC power flow?
3. What is sequential method of DC power flow?
4. What are the advantages of variable elimination method over extended variable method?
5. Draw the DC system model.
6. Draw the norton's equivalent circuit for a converter.
7. What are the additional constraints needed to be included for ac-dc power flow?
8. List some essentials of power flow analysis.
9. Compare sequential and simultaneous methods of ac-dc power flow.
10. What are the major steps in the power flow analysis of MTDC-AC Systems.

16 marks

1. Explain extended variable method of DC power flow.
2. Explain the variable elimination method of DC power flow.
3. Explain the sequential method of DC power flow. Draw the necessary flow chart.
4. Explain about perunit system for DC quantities.
5. Compare sequential and unified methods of DC power flow.
6. Explain unified method of DC power flow.

7. Explain the procedure for modeling of dc links with example?
8. Draw the flow chart for the ac-dc power flow and a 5 terminal dc system and explain.
9. Discuss in detail the modeling of dc links.

UNIT- 5

2 Mark

1. What are the tools that can be employed for the simulation of a dynamic system?
2. What are the requirements of a good HVDC system simulation tools?
3. Mention the number of system studies that required for the design of a HVDC system.
4. Draw the physical model of a converter transformer.
5. Draw the bipolar HVDC line section model.
6. What are the problems that can be studied using DC simulator?
7. What is parity simulator?
8. Draw the EMTF model of Valve.
9. What is digital dynamic simulation of HVDC system?
10. What are the applications of a DC simulator?

16 Mark

1. Explain the HVDC system simulation philosophy and tools.
2. Explain the parity simulator.
3. Explain the Digital dynamic simulation and its advantages.
4. Explain the physical model of simulation of HVDC system.
5. Explain the modeling of HVDC system for digital dynamic simulation.
6. Explain the HVDC system simulation.
7. Explain the parity simulator and bring out its advantages over analog computer simulation.
8. Explain valve and converter model.
9. What are the advantages and disadvantages of digital simulation? Write short note on digital dynamic simulation.
10. Draw the physical model of HVDC simulator and highlight the problems that can be studied using it.
11. List some problems that can be studied using DC simulator.
12. Discuss in detail the modeling of HVDC system for digital dynamic simulation.