

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTION BANK

COURSE TITLE : HVDC TRANSMISSION

COURSE CODE : 23EE705

REGULATION : R23

S.No.	UNIT-III: Power Flow Analysis in AC/DC Systems	BT	CO	PO
	Short Answer Questions			
1	What is meant by power flow analysis in AC/DC systems?	BT1	CO3	PO1
2	Define DC link modeling in power flow studies.	BT1	CO3	PO1
3	What are the basic components of a DC network?	BT1	CO3	PO1
4	What is the purpose of converter equations in AC/DC power flow analysis?	BT2	CO3	PO1
5	Define controller equations used in HVDC systems.	BT1	CO3	PO1
6	What is DC load flow analysis?	BT1	CO3	PO1
7	Why is the per-unit (P.U.) system used for DC quantities?	BT2	CO3	PO1
8	What are the advantages of using the P.U. system in power system studies?	BT2	CO3	PO1
9	Distinguish between simultaneous and sequential methods of AC-DC power flow solution.	BT3	CO3	PO2
10	What are the main challenges in solving AC-DC power flow problems?	BT2	CO3	PO2
	Long Answer Questions			
11	Explain the need for power flow analysis in AC/DC systems and discuss its significance in HVDC transmission studies.	BT2	CO3	PO1

12	Describe the modeling of DC links for power flow analysis. Explain the assumptions and equations involved.	BT4	CO3	PO2
13	Explain the representation and modeling of a DC network in AC/DC power flow studies.	BT4	CO3	PO2
14	Derive and explain the DC converter equations used in AC/DC system analysis. Discuss their importance in load flow calculations.	BT4	CO3	PO2
15	Discuss the controller equations used in HVDC systems. Explain how these equations influence power flow solutions.	BT4	CO3	PO2
16	Explain the procedure for solving DC load flow problems. Illustrate the method with a suitable flow chart.	BT3	CO3	PO2
17	Discuss the Per Unit (P.U.) system for DC quantities. Explain the selection of base quantities and conversion formulas.	BT3	CO3	PO1
18	Explain the formulation and solution of AC-DC power flow using the Simultaneous Method. Discuss its advantages and limitations.	BT4	CO3	PO2
19	Explain the Sequential Method for solving AC-DC power flow problems. Compare its computational procedure with the Simultaneous Method.	BT4	CO3	PO2
20	Compare Simultaneous and Sequential methods of AC-DC power flow analysis with respect to convergence characteristics, computational requirements, accuracy, and practical applications.	BT4	CO3	PO2
11	Explain the various converter faults encountered in HVDC transmission systems and discuss their causes and effects.	BT4	CO4	PO2
12	Describe the protection schemes employed against overcurrent in converter stations. Explain the operation of protective devices used.	BT4	CO5	PO2
13	Explain the causes of overvoltages in HVDC systems and discuss the methods used for overvoltage protection.	BT4	CO5	PO2
14	Describe the construction, operation, and characteristics of surge arresters used in HVDC converter stations.	BT2	CO5	PO1

15	Explain the function and importance of smoothing reactors in HVDC transmission systems. Discuss their advantages and limitations.	BT4	CO5	PO2
16	Discuss the need for DC breakers in HVDC systems. Explain the operating principles and challenges involved in interrupting DC currents.	BT4	CO5	PO2
17	Explain the phenomenon of audible noise in HVDC transmission lines. Discuss the factors affecting its generation and methods of reduction.	BT4	CO5	PO2
18	What is the space charge field in HVDC transmission? Explain its formation and influence on electric field distribution around conductors.	BT4	CO5	PO2
19	Discuss corona effects on DC transmission lines. Explain the factors affecting corona formation and its impact on system performance.	BT4	CO5	PO2
20	Explain the causes, effects, and mitigation techniques of radio interference in HVDC transmission systems. Compare radio interference levels in AC and DC transmission lines.	BT4	CO5	PO2