R20 Regulation *Subject code: 3E7BD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VII Semester Regular/Supplementary Examinations, December 2024

HVDC TRANSMISSION SYSTEMS

(EEE)

Maximum Marks: 70 Date:04.01.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	List out the applications of DC transmission system.	1	1
2	Define the coupling factor of 12 pulse converter.	1	1
3	Define the current control?	2	1
4	What are the uses of static VAR compensators in HVDC system?	2	1
5	Write the equation of DC Converter Control.	3	1
6	Define per unit (P.U.) system and its significance in DC power flow analysis.	3	1
7	List out various converter faults in HVDC system.	4	1
8	How corona affects the DC line?	4	1
9	What are the sources for generation of harmonics in HVDC system?	5	1
10	What is the role of the AC filter in HVDC transmission?	5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	A) With a neat schematic diagram, state the various apparatus required for HVDC station and explain the purpose of each. [6M] B) Describe economic aspects in the HVDC Transmission. [4M]	1	1 2
	OR		
12	For a Graetz 's converter circuit obtain the transformer VA rating and valve VA rating in terms of dc line current and dc voltage using neat wave forms. [10M]	1	3
13	A) Explain in detail about the starting and stopping criterion of DC link. [5M] B) Discuss in detail, the concept of reactive power requirement in HVDC converters. [5M]	2 2	2 2
	OR		
14	Describe firing angle control in converter station. [10M]	2	2
15	A) Describe the main components of a DC link in an AC/DC power system. How do these components work together to facilitate efficient power transfer? [6M] B) Discuss the modeling of DC links in AC/DC systems. [4M]	3	2 2

	OR		
16	Provide a detailed explanation of the steps involved in the sequential method of AC-DC power flow analysis, including how convergence is achieved. [10M]	3	2
17	Describe over voltage protection in Converter station with neat diagram. [10M]	4	2
	OR		
18	A) Describe the terms. i) Audible Noise ii) Space charge field [6M] B) Explain the Smoothing reactors in detail. [4M]	4	2 2
19	A) Explain characteristic and non-characteristic harmonics. [6M] B) What are the filter configurations that are employed for HVDC converter station? Give design aspect of one such filter. [4M]	5	2 3
	OR		
20	What are the different types of filters used on the AC side of an HVDC system? How are they located and arranged? [10M]	5	1