R20 Regulation *Subject code:3E7BD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, November 2025

HVDC TRANSMISSION SYSTEMS

(EEE)

Maximum Marks: 70 Date: 02.11.2026 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.
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)		Marks	CO	BTL
1	List out the applications of HVDC?	2M	1	L1
2	What are the types of DC link?	2M	1	L1
3	What is basic principle of dc link control?	2M	2	L1
4	List the drawbacks of EPC Scheme.	2M	2	L1
5	What is double commutation failure?	2M	3	L1
6	What is smoothing reactors?	2M	3	L1
7	Explain about filters.	2M	4	L1
8	What are the different types of faults occurred in converter station?	2M	4	L1
9	What is the effect of pulse number on harmonics?	2M	5	L1
10	What are the different types of filters using in HVDC transmission system?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Draw the schematic circuit diagram of a 6 - pulse Graetz's circuit and explain its principle of operation.	10M	1	L2
	OR			
12	a) With neat sketches explain the different types of HVDC links. b) Explain modern trends in HVDC system.	5M 5M	1	L2
13	With block diagram, discuss the principle of operation of a basic power controller.	10M	2	L2
	OR			
14	Describe about extinction angle control employed in a converter.	10M	2	L2
15	a) Describe the per unit system. b) Discuss in detail solution of DC load flows.	5M 5M	3	L2
	OR			
16	a) Describe constant ignition angle control. b) Describe individual phase control.	5M 5M	3	L2

17	Explain in detail the causes of over voltages due to AC and DC side faults. Draw the appropriate diagrams where ever necessary.	10M	4	L2
	OR			
18	a) What are the basic principles of over current protection? b) Discuss the various faults exist in converter protection.	5M 5M	4	L2
19	What do you understand from the term harmonics? Explain how are AC harmonics Calculated?	10M	5	L2
	OR			
20	a) Explain the design of single tuned filters. b) Discuss the need to employ filter circuit in HVDC systems. Derive an expression for minimum cost of tuned AC filter used in HVDC systems.	5M 5M	5	L2