R22 Regulation *Subject code: 4P8BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VIII Semester Regular Examinations, May 2026

HVDC TRANSMISSION SYSTEMS

(EEE)

Maximum Marks: 60 Date:04.05.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 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 (10X1M=10 Marks)		Marks	CO	BTL
1.a)	State any two modern trends in HVDC transmission.	1M	1	L1
b)	State the advantages in DC transmission.	1M	1	L1
c)	Define extinction angle control in HVDC converters.	1M	2	L1
d)	What is power control in HVDC system?	1M	2	L1
e)	Mention the sources of reactive power in HVDC transmission.	1M	3	L2
f)	Write the basic considerations for modelling DC systems	1M	3	L1
g)	List the reasons for over voltages in HVDC Systems.	1M	4	L2
h)	Define radio interference in DC lines.	1M	4	L1
i)	Distinguish between characteristic and non-characteristic harmonics.	1M	5	L1
j)	What is the effect of pulse number on harmonics?	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Draw the layout of a Bi-polar HVDC substation and briefly discuss about various.	10M	1	L3
	OR			
3	Derive the expression for input power, output power and power factor of 12- pulse bridge converter with delay angle α. Assume there is no overlap.	10M	1	L3
4	A. Explain extinction angle control with characteristics. B. Explain role of static VAR compensators.	5M 5M	2	L4
	OR			
5	A. Discuss in detail the effect of source inductance on HVDC systems. B. Explain starting and stopping of DC Link.	5M 5M	2	L4
6	A. Explain DC converter modelling for load flow analysis. B. Explain sequential method of AC-DC power flow.	5M 5M	3	L4
	OR			

7	Draw the flowchart and explain about the methods for finding the solution of AC-DC power flow.	10M	3	L4
8	A. Explain converter faults in HVDC systems. B. Explain protection against over-current in converter stations.	5M 5M	4	L4
	OR			
9	A. Explain operation of smoothing reactor. B. Explain corona effect and space charge field in DC lines.	5M 5M	4	L4
10	A. What are the filter configurations that are employed for HVDC converter station? Give design aspect of one such filter. B. Why High pass filters are provided with damping resistor? Also explain about advantages, disadvantages of High Pass Filter.	5M 5M	5	L4
	OR			
11	A. Explain design of single tuned filter with example. B. What are characteristic and non-characteristic harmonics?	5M 5M	5	L4