Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 80020

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025
Seventh Semester
Electrical and Electronics Engineering
U19EEV11 – HVDC TRANSMISSION SYSTEM
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Mention the need for HVDC Transmission.	2	K1	CO1
2.	Write any two locations in India, where the HVDC transmission system is implemented.	2	K1	CO1
3.	Define harmonics and its causes.	2	K1	CO2
4.	Differentiate active filter and passive filter.	2	K2	CO2
5.	Define Voltage stability.	2	K1	CO3
6.	Infer the importance of reactive power compensation in HVDC transmission system.	2	K2	CO3
7.	Classify the types of fault in HVDC Transmission System.	2	K1	CO4
8.	List out different protection methods in HVDC Transmission system.	2	K2	CO4
9.	Mention any two advantages of wind power.	2	K1	CO5
10.	Define cut-in and cut-out wind speeds.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Discuss about major reliability issues related to converters, transmission lines and control systems and what measures are adopted to improve the reliability of HVDC transmission networks?	13	K2	CO1

(OR)

	b)	Compare the cost and performance of HVAC and HVDC systems for different transmission distances. Discuss the economic aspects of HVDC projects.	13	K2	CO1
12.	a)	With neat sketches, explain different types of active power filters (shunt, series and hybrid). Derive the control strategy used for harmonic current compensation.	13	K1	CO2
		(OR)			
	b)	With necessary equations, explain how the pulse number of a converter influences the harmonic spectrum. Illustrate with examples.	13	K2	CO2
13.	a)	Discuss in detail about the constant current, constant extinction angle and constant voltage control strategies used in HVDC systems.	13	K2	CO3
		(OR)			
	b)	Explain the concept of AC–DC system interaction under fault conditions. How can these interactions minimized?	13	K2	CO3
14.	a)	Discuss the role of DC circuit breakers, fast fault clearing, and converter bypass switches in the protection of HVDC systems.	13	K3	CO4
		(OR)			
	b)	Compare insulation coordination requirements for AC systems and HVDC systems. Highlight the additional challenges unique to HVDC.	13	K3	CO4
15.	a)	Explain the main advantages of VSC-HVDC over conventional LCC-HVDC in terms of control, reactive power support and suitability for weak AC grids.	13	K3	CO5
		(OR)			
	b)	Explain the challenges of integrating large wind farms with HVDC transmission. How does HVDC improve the reliability of wind power delivery?	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Describe about any one of the ±800 kV HVDC link in India. Discuss its design, capacity and importance to the national grid.	15	K3	CO5
		(OR)			
	b)	Discuss a case studies where HVDC–AC system interactions have caused operational challenges. What mitigation measures are suggested?	15	K3	CO5