Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021

Subject Code:3160921 Date:04/12/2021

Subject Name:HVDC Transmission Systems

Time:10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Compare AC and DC Transmission in view of economy and reliability.	**03**
	(b)	Describe selective harmonic elimination technique.	**04**
	(c)	Describe the schematic diagram of a HVDC link, mentioning all the key elements.	**07**
Q.2	**(a)**	Write types of HVDC systems.	**03**
	(b)	Explain six pulse converter with neat diagram.	**04**
	(c)	Explain effects of firing angle delay in line commutated converters.	**07**
		OR	
	(c)	Explain twelve pulse converters.	**07**
Q.3	**(a)**	Classify PWM techniques.	**03**
	(b)	Explain rotating reference frame theory.	**04**
	(c)	Explain real and reactive power control using VSC.	**07**
		OR	
Q.3	**(a)**	Explain starting and stopping of HVDC link.	**03**
	(b)	Explain principles of DC Link Control in a VSC based HVDC system.	**04**
	(c)	Write short note on high level controllers.	**07**
Q.4	**(a)**	Explain corona effect.	**03**
	(b)	Enlist different types of insulators. Explain all in short.	**04**
	(c)	Draw Phase locked loop diagram. Explain its working in detail.	**07**
		OR	
Q.4	**(a)**	Enlist reactive power sources in HVDC system.	**03**
	(b)	Explain basic concept of power system angular control.	**04**
	(c)	Explain basic principles of synchronous and asynchronous links.	**07**
Q.5	**(a)**	Write types of Multi-terminal HVDC System.	**03**
	(b)	Explain Mono-polar Operation of HVDC link.	**04**
	(c)	Write short note on DC circuit breakers.	**07**
		OR	
Q.5	**(a)**	What is modular multilevel converter?	**03**
	(b)	Explain Parallel Operation of HVDC.	**04**
	(c)	Write notes on voltage stability problems in HVAC/DC systems.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3160921 Date:10/06/2022

Subject Name:HVDC Transmission Systems

Time:10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Compare of AC and DC Transmission.	**03**
	(b)	What are the limitations of HVDC Transmission lines?	**04**
	(c)	Explain various types of HVDC systems.	**07**
Q.2	**(a)**	Explain basic principle of three-phase AC–DC conversion.	**03**
	(b)	Describe Commutation Process.	**04**
	(c)	Draw and explain six pulse converter operation.	**07**
		OR	
	(c)	Draw and explain twelve pulse converter operation.	**07**
Q.3	**(a)**	Explain VSC operating principle.	**03**
	(b)	List out various characteristic of Harmonics.	**04**
	(c)	Describe sinusoidal pulse width modulation with diagram.	**07**
		OR	
Q.3	**(a)**	How to do selective harmonic elimination?	**03**
	(b)	Explain firing angle control.	**04**
	(c)	What are the various Higher-level Controllers? Explain any one in detail.	**07**
Q.4	**(a)**	Explain function of smoothing reactors in HVDC system.	**03**
	(b)	Explain principles of DC Link Control in a VSC based HVDC system.	**04**
	(c)	Describe AC voltage regulation using VSC.	**07**
		OR	
Q.4	**(a)**	Explain function of Ground Electrodes in HVDC system.	**03**
	(b)	Explain principles of DC Link control in a LCC HVDC system.	**04**
	(c)	Explain in detail control of power in MTDC.	**07**
Q.5	**(a)**	Explain DC line faults in LCC systems.	**03**
	(b)	Describe voltage stability problem in AC/DC systems.	**04**
	(c)	Explain types of multi-terminal HVDC System.	**07**
		OR	
Q.5	**(a)**	Explain DC line faults in VSC systems.	**03**
	(b)	Explain basic principles of synchronous and asynchronous links.	**04**
	(c)	Explain modular multi-level converters.	**07**

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