

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

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
