Code No:**R1642022** **R16** **Set No. 1**

IV B.Tech II Semester Regular Examinations, September - 2020

HVDC TRANSMISSION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
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PART–A*(14 Marks)*

1.	a)	Explain types of HVDC links.	[2]
	b)	What is pulse number of a converter? What is its significance?	[3]
	c)	What is cosine firing controller?	[2]
	d)	What are the sources for reactive power?	[2]
	e)	What are the characteristics of harmonics?	[3]
	f)	Explain Types of AC filters.	[2]

PART–B*(4x14 = 56 Marks)*

2.	a)	What are the advantages of HVDC Transmission systems?	[7]
	b)	Explain HVDC Characteristics and Economic Aspects in the HVDC Transmission?	[7]
3.	a)	Draw the waveforms and explain 12 Pulse converters for the conduction angle of 120 degrees for the RL-load?	[7]
	b)	List the factors that decide the converter configuration?	[7]
4.	a)	Explain Starting and Stopping of DC-link?	[7]
	b)	Explain the terms constant extinction angle and constant ignition angle control.	[7]
5.	a)	Distinguish between simultaneous method and sequential method with appropriate diagrams in power flow analysis?	[7]
	b)	What is reactive power? How to compensate for reactive power using shunt compensation elements?	[7]
6.	a)	Explain over voltage and current protection in Converter station.	[7]
	b)	Discuss the list of dominant harmonics present in the various types of HVDC converters.	[7]
7.	a)	Explain the design procedure for a single tune filter.	[7]
	b)	Explain what is the importance's of AC filters in a converter station.	[7]

Code No:**R1642022** **R16** **Set No. 2**

IV B.Tech II Semester Regular Examinations, September - 2020

HVDC TRANSMISSION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
*****

PART–A*(14 Marks)*

1.	a)	What are the demerits of HVDC transmission?	[2]
	b)	Differentiate between 6-pulse and 12-pulse converters.	[3]
	c)	What is meant by firing angle control.	[2]
	d)	What is the importance of reactive power?	[2]
	e)	How corona affects the DC line?	[2]
	f)	How to reduce harmonics by using an AC filter?	[3]

PART–B*(4x14 = 56 Marks)*

2.	a)	With neat sketches explain the different kinds of D.C. links available and list out its merits and demerits	[7]
	b)	What are the advantages of HVDC Transmission systems?	[7]
3.	a)	Draw the waveforms and explain 6 Pulse converters for the conduction angle of 60 and 120 degrees for the R-load.	[7]
	b)	List out Converter Station Equipment and describe them in detail.	[7]
4.	a)	What are the desired features of Converter Control?	[7]
	b)	Explain the complete characteristics of the rectifier and inverter.	[7]
5.	a)	Classify the solution methodology for the AC-DC load flows and explain them briefly.	[7]
	b)	Discuss in detail, the concept of reactive power requirement in HVDC converters.	[7]
6.	a)	Explain the Surge arrester and smoothing reactor in detail.	[7]
	b)	Briefly discuss about different harmonic instability problems.	[7]
7.	a)	Explain the Design procedure of AC Filter.	[7]
	b)	Explain in detail a double tuning filter.	[7]

Code No:**R1642022** **R16** **Set No. 3**

IV B.Tech II Semester Regular Examinations, September - 2020

HVDC TRANSMISSION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
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PART–A*(14 Marks)*

1. a) Explain the technical performance of HVDC Transmission. [2]
   b) What are the Desired features of the converter station? [2]
   c) Why is 'control' required in HVDC systems? Draw the converter control characteristics? [3]
   d) What are the sources for reactive power generation? [2]
   e) Briefly explain the DC breaker. [2]
   f) What is the role of the AC filter in HVDC transmission? [3]

PART–B*(4x14 = 56 Marks)*

2. a) Explain Modern trends and planning of the HVDC Transmission System. [7]
   b) Make a comparison between HVAC and HVDC transmission. [7]

3. a) Explain 12 pulse converter by connecting two-star 3phase converters. [7]
   b) Explain the analysis of Graetz circuit and waveforms for overlap angle is 60 degrees [7]

4. a) Discuss equidistant pulse firing angle control scheme with its relative merits and demerits [7]
   b) Explain in detail the significance of constant extinction angle control. [7]

5. a) What do you understand from the term reactive power? Explain the causes of reactive power absorbed by the HVDC converter substation. [7]
   b) Classify the solution methodology for the AC-DC load flows and explain them briefly. [7]

6. a) Explain over voltage and current protection in the converter station. [7]
   b) Explain the characteristics harmonics and non-characteristics harmonics. [7]

7. a) Explain the design procedure for a single tune filter. [7]
   b) Explain what is the importance's of AC filters in a converter station [7]

Code No:**R1642022** **R16** **Set No. 4**

IV B.Tech II Semester Regular Examinations, September - 2020

HVDC TRANSMISSION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
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PART–A *(14 Marks)*

1. a) What are the applications of the DC transmission system? [2]
   b) What is the pulse number? [3]
   c) Explain the source inductance in the system. [2]
   d) What is a synchronous condenser? [2]
   e) What is radio interference? [3]
   f) What are the types of AC filters? [2]

PART–B *(4x14 = 56 Marks)*

2. a) Explain the applications of HVDC transmission. [7]
   b) List out Converter Station Equipment and describe them in detail. [7]

3. a) With neat sketches explain the different kinds of D.C. links available and list out its merits and demerits. [7]
   b) A 6-pulse bridge connected inverter is fed from 238/110 kV transformer which is connected with 3-phase, 238 kV, 50Hz supply. Calculate the direct voltage output when the commutation angle is 20^0 and delay angle α is i) 30^0, ii) 90^0 and iii) 150^0. Comment on the results. [7]

4. a) Explain how to control the power in the HVDC link. What is a drawback in power control? [7]
   b) Explain constant current control and constant ignition angle control. [7]

5. a) What are the Conventional control strategies for reactive power control? [7]
   b) Distinguish between simultaneous method and sequential method with appropriate diagrams in power flow analysis. [7]

6. a) How to calculate voltage and current harmonic in the system? [7]
   b) Discuss in detail the sequential method for the solution of the AC/DC load flow. [7]

7. a) Explain the Design procedure of AC Filter. [7]
   b) Explain in detail a double tuning filter. [7]