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Code No: **RT41022 R13**

Set No. 1

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018 HVAC & DC 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 THREE questions from Part-B *****

		<u> </u>	
1.	a)b)c)d)e)f)	PART-A (22 Marks) Write on Necessity of EHV AC transmission. Discuss on corona pulse generation properties and limits. Write the applications of DC Transmission systems. Write briefly on starting and stopping of DC Link. Explain synchronous condensers in the reactive control of HVDC Transmission. Write short notes on design of high pass filter.	[3] [3] [4] [4] [4]
2.	a) b)	PART-B ($3x16 = 48$ Marks) Explain standard Transmission voltage levels that are recognized in India and give its significance. Explain the effect of conductor resistance on extra high voltage lines.	[8] [8]
3.	a) b)	Explain frequency spectrum of radio noise in EHVAC Transmission lines. Explain the Corona generating function or the excitation function caused by injected current at radio frequencies from corona discharges with a neat circuit.	[8]
4.	a) b)	Discuss various types of HVDC links and their relative merits. Compare AC and DC Transmission system based on technical and economical aspects.	[8] [8]
5.	a)b)	Explain the conventional control strategy employed in HVDC systems. Write a note on Alternate control strategies. Explain Basic means of control and firing angle control.	[8] [8]
6.	a)b)	What is meant by reactive power control? How it is achieved? Explain in detail in HVDC Systems. Explain the effect of source inductance on 6 pulse Graetz circuit in HVDC system.	[8]
7.	a) b)	Explain characteristic of harmonics and uncharacteristic of harmonics. What are the orders of harmonic voltages in six pulse converter? What is the effect of overlap angle on these harmonics?	[8]



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Max. Marks: 70

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

PART-A (22 Marks)

1.	a)	Write the role of Extra high voltage ac Transmission in the present world	[2]
	b)	scenario. Write the limits and measurements of audible noise.	[3] [3]
	c)	Write apparatus required various HVDC Systems.	[4]
	d)	Write detailed notes on Power control of HVDC converters.	[4]
	e)	Write about reactive power requirements in the control of HVDC Transmission.	[4]
	f)	Write objectives of Filters employed in HVDC station.	[4]
		$\underline{\mathbf{PART-B}} \ (3x16 = 48 \ Marks)$	
2.	a)	Derive the equation for the maximum surface voltage gradients for more than or	
		equal to 3 sub-conductor bundle.	[8]
	b)	List some of the important properties of the Bundled Conductors.	[8]
3.	a)	With a simple block diagram, explain the Audible noise measuring circuit in	
		Extra high voltage ac lines.	[8]
	b)	Explain the different factors on which the audible noise generated by a line	
		Depends?	[8]
4.	a)	Discuss in detail the advantages and disadvantages of HVDC transmission	ro1
	1- \	system over HVAC system.	[8]
	b)	Explain different modern trends in HVDC Transmission Systems.	[8]
5.	a)	Show that rating of the valve used in Graetz circuit is 2.094 Pd, where Pd is d.c	
٠.	u,	power transmitted.	[8]
	b)	Draw a schematic of a 6 pulse converter circuit and derive from fundamentals,	[~]
		the expression for voltage and currents for the operation of converter as a	
		rectifier and inverter with relevant waveforms.	[8]
6.	a)	Discuss the conventional controls strategies of reactive power controllers in	
		HVDC systems.	[8]
	b)	What is the role of AC filters and shunt capacitors in reactive power control	[8]
7.	a)	How do you estimate the harmonic order based upon pulse number of HVDC	
	,	converter station.	[8]
	b)	Discuss various types of AC filters employed in HVDC systems.	[8]



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Set No. 3

[8]

[8]

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		Question paper consists of Part-A and Part-B Answer ALL sub questions from Part-A Answer any THREE questions from Part-B *****		
		PART-A (22 Marks)		
1.	a)	Write the properties of the Bundled Conductors.	[3]	
	b)	Discuss on corona pulse generation properties and limits.	[4]	
	c)	Write apparatus required various HVDC systems.	[3]	
	d)	Write the effect of source inductance on HVDC power converter.	[4]	
	e)	Write short notes on conventional control strategies in the reactive control of		
		HVDC Transmission.	[4]	
	f)	Write about adverse effects of harmonics.	[4]	
		$\underline{\mathbf{PART-B}} \ (3x16 = 48 \ Marks)$		
2.	a)	Prove that a one 750 KV line power handling capacity of a.c transmission line		
		carry as much power as four 400 KV circuits for equal distance of transmission.	[8]	
	b)	Explain different mechanical considerations that are taken in to account for		
		Transmission line performance.	[8]	
3.	a)	A 3- phase line yields AN levels from individual phases to be 65dB, 62dB, and		
		58dB.Find the resulting AN level of the line.	[8]	
	b)	What do you mean by Corona discharge and explain the different types of corona		
		discharge from transmission line conductors.	[8]	
	,	Discourse de la CHADO DA La	FO.7	
4.	a)	Discuss various types of HVDC links and their relative merits.	[8]	
	b)	Compare AC and DC Distribution Systems and write various applications of DC	г о л	
		Transmission systems.	[8]	
5.	a)	Draw the connection diagram of two, 3 phase converter transformers to a 12		
٦.	a)	pulse converter bridge.	[8]	
	b)	With block diagram, explain the hierarchical control structure for a DC link.	[8]	
	U)	man block diagram, explain the metalemeal conduct structure for a De mik.	[O]	
6.	a)	Explain the role of shunt capacitors in reactive power control of HVDC systems.	[8]	
	b)	Briefly discuss the sources of reactive power in HVDC systems.	[8]	

7. a) Discuss in brief the effect pulse number and harmonics in converter circuits.

b) Discuss the design aspects of High Pass filter.



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

		PART-A (22 Marks)	
1.	a)	Write on Necessity of EHV AC transmission.	[3]
	b)	Derive Corona loss formule.	[3]
	c)	Compare AC Transmission and DC Transmission.	[4]
	d)	Write briefly on starting and stopping of DC Link.	[4]
	e)	What is the necessity of ac filters in HVDC system?	[4]
	f)	Explain calculation of voltage and current harmonics.	[4]
		$\underline{\mathbf{PART-B}} \ (3x16 = 48 \ Marks)$	
2.	a)	Explain the role of Extra high voltage ac Transmission in the present world	F07
	1 \	scenario.	[8]
	b)	Explain the effect of skin effect on the overhead line conductors.	[8]
3.	a)	Explain the limits for Radio interference fields that occur in EHVAC	
		transmission lines.	[8]
	b)	With a neat diagram explain the measurement of Radio influence Voltage	
		(RIV).	[8]
4.	a)	State the advantages and disadvantages of dc transmission system in terms of	FO.3
	1. \	economics, reliability and performance.	[8]
	b)	Discuss various types of HVDC links and their relative merits.	[8]
5.	a)	Explain the principle of dc link control in HVDC system.	[8]
	b)	Discuss briefly about constant extinction angle control in HVDC systems.	[8]
6.	a)	Explain in detail about reactive power requirement in HVDC converters.	[8]
	b)	Briefly discuss the sources of reactive power in HVDC systems.	[8]
7.	a)	What are different non-characteristic harmonics? Explain their adverse effects.	[8]
	b)	Derive an equation for harmonic voltage and current for single tuned filter and	
	,	discuss the influence of network admittance.	[8]