Code No: **R42023** **R10** **Set No. 1**

IV B.Tech II Semester Regular Examinations, April/May - 2014

EXTRA HIGH VOLTAGE TRANSMISSION

(Electrical and Electronics Engineering)

Time : 3 hours **Max. Marks: 75**

Answer any Five Questions
All Questions carry equal marks
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1	a)	Explain standard Transmission voltage levels that are recognized in India and give its significance.	[8]
	b)	Explain the effect of conductor resistance on extra high voltage lines.	[7]
2		Derive the equation for the maximum surface voltage gradients for more than or equal to 3 sub-conductor bundle.	[15]
3	a)	Explain Day-Night equivalent Noise level.	[7]
	b)	Explain attenuation of travelling waves due to corona.	[8]
4	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).	[7]
5		Draw a neat lay out diagram of HVDC transmission system and explain the each part with its importance.	[15]
6	a)	Derive the equations for power flow in an HVDC link. Also explain how the losses are estimated?	[10]
	b)	Explain the term Peak inverse voltage and its importance	[5]
7	a)	What do you understand by extinction angle control? what are the limitations under asymmetrical fault	[8]
	b)	What is the necessity of VDCOL control used in HVDC systems?	[7]
8		What are the different types of filters used on the AC side of an HVDC System? How are they located and arranged?	[15]

Code No: **R42023** **R10** **Set No. 2**

IV B.Tech II Semester Regular Examinations, April/May - 2014
EXTRA HIGH VOLTAGE TRANSMISSION
(Electrical and Electronics Engineering)

Time : 3 hours **Max. Marks: 75**

Answer any Five Questions
All Questions carry equal marks
*****

1 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. [7]

2 a) Explain the properties of the field of a point charge [8]
b) Explain surface voltage gradient on conductors in a bundle [7]

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. [7]

4 What do you mean by Corona discharge and explain the different types of corona discharge from transmission line conductors [15]

5 a) Compare the relative merits and demerits of AC transmission system over DC transmission system [8]
b) What do you understand by surge impedance loading? what is its importance [7]

6 a) What do you understand by the terms i) Commutating voltage and ii) commutation reactance and discuss the effect of these on the output voltage of the converter [8]
b) Calculate the secondary line voltage of the transformer for 3-phase bridge rectifier to provide a DC voltage of 120 KV. Assume $\alpha = 30^0$, $\mu = 15^0$. What is the effective resistance, if the rectifier gives 800 A of DC output current [7]

7 With relevant diagrams explain the operation of IPC and EPC schemes employed in control schemes of firing circuits of HVDC stations. State the relative merits and demerits of each scheme [15]

8 Write short notes on the following:
a) Design of High pass filters
b) Effect of Source inductance on a HVDC System
c) Properties of Bundled Conductor [15]

Code No: **R42023** **R10** **Set No. 3**

IV B.Tech II Semester Regular Examinations, April/May - 2014

EXTRA HIGH VOLTAGE TRANSMISSION

(Electrical and Electronics Engineering)

Time : 3 hours **Max. Marks: 75**

Answer any Five Questions

All Questions carry equal marks

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1 a) Explain the role of Extra high voltage ac Transmission in the present world scenario. [8]

b) Explain the effect of skin effect on the overhead line conductors. [7]

2 a) Explain the field of line charges and their properties [8]

b) Explain the importance of surface voltage gradient factors in Extra high voltage lines. [7]

3 a) Explain the quantities on which the Audible noise level depends for the Extra high voltage ac lines [8]

b) A 3- phase line yields AN levels from individual phases to be 65dB,62dB, and 58dB.Find the resulting AN level of the line [7]

4 Explain the properties of Pulse trains and Filter response and further prove that " a positive corona pulse yields much higher noise level than a negative corona pulse" [15]

5 a) Prove that a mono polar DC line can transmit 1.5 times the power an AC line can transmit for the same conductor size and system maximum voltage [8]

b) List the limitations of HVDC Transmission lines [7]

6 Derive the expressions for Peak inverse voltage ,peak to peak ripple and valve volt ampere rating for a 6-pulse Graetz's converter circuit [15]

7 a) Explain why an inverter should be compounded with constant current control in addition to CEA control [8]

b) Explain the operation of pulse frequency control and state why it is preferred in modern HVDC systems [7]

8 a) Show that the current harmonics generated for 12 – pulse operation is given by the expression pK±1. Where K is the integer and p is pulse number [8]

b) List the different factors on which the Non-characteristic harmonics depend [7]

Code No: **R42023** **R10** **Set No. 4**

IV B.Tech II Semester Regular Examinations, April/May - 2014
EXTRA HIGH VOLTAGE TRANSMISSION
(Electrical and Electronics Engineering)

Time : 3 hours **Max. Marks: 75**

Answer any Five Questions
All Questions carry equal marks
*****

1 a) Explain the terms Aeolian vibration, Galloping and Wake – induced Oscillations with respect to transmission line performance. [8]
b) List some of the important properties of the Bundled Conductors. [7]

2 a) Explain the maximum charge condition on a 3 – phase line [8]
b) The field strength on the surface of a sphere of 1 cm radius is equal to the corona inception gradient in air of 30 KV/cm. Find the charge on the sphere. [7]

3 Explain the behaviour of space – charge effects inside a corona envelope and discuss why load current cannot flow in a conductor inside this envelope even though it is a conducting zone [15]

4 a) Explain frequency spectrum of radio noise in EHVAC Transmission lines [8]
b) Explain the Corona generating function or the excitation function caused by injected current at radio frequencies from corona discharges with a neat circuit. [7]

5 a) Give neat sketch of different HVDC links. Why is Bipolar line more commonly used? [8]
b) Prove that the DC insulation level required is only 86.66% of that required in an AC system for the same power transmitted and equal losses. [7]

6 Derive the relation between the Dc output voltage and the ac line voltage (rms) and the rating of the converter transformer with Graetz's converter circuit [15]

7 a) Explain the relative merits and demerits of constant current and constant voltage operation of an HVDC link [8]
b) Explain the differences in power control in HVDC and HVAC systems and explain the necessity of power control in an HVDC Link [7]

8 a) What are non-characteristic harmonics in HVDC systems? How are they generated [8]
b) Explain single tuned and Double tuned filter configurations along with their impedance characteristics [7]