Hall Ticket No: | | | | | | | | | | |

Question Paper Code: AEE504

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-I

B.Tech VI Semester End Examinations (Regular), April – 2020

Regulation: IARE–R16

EXTRA HIGH VOLTGE AC TRANSMISSION

(Electrical and Electronics Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1	a)	Explain standard Transmission voltage levels that are recognized in India and give its significance?	[7M]
	b)	Explain the effect of conductor resistance on extra high voltage lines?	[7M]
2	a)	Explain necessity of EHV AC transmission and mechanical considerations for transmission?	[7M]
	b)	Discuss why EHV AC Lines are Necessary to transmit large blocks of power over long distances?	[7M]

UNIT – II

3	a)	Determine the field of sphere gap in EHV AC system?	[7M]
	b)	Describe the charge-potential relations of a transmission line with n conductors on a tower?	[7M]
4	a)	Explain in detail surface voltage gradient on conductors?	[7M]
	b)	What are gradient factors and their use?	[7M]

UNIT – III

5	a)	What is the effect of Increase in Effective Radius of Conductor and Coupling Factors?	[7M]
	b)	Give corona loss formulae based on voltages and voltage gradients?	[7M]
6	a)	Give equations for frequency spectrum of the RI field of line?	[7M]
	b)	Draw the block diagram of AN Measuring Circuit?	[7M]

UNIT – IV

7	a)	Obtain electrostatic fields of single circuit 3-phase EHV line?	[7M]
	b)	Explain the effect of high electrostatic field on human, animals and plants?	[7M]
8	a)	Derive an equation for calculation of electrostatic field of double-circuit 3-phase AC line?	[7M]
	b)	Obtain electrostatic induction on unenergised circuit of double circuit EHVAC line?	[7M]

UNIT – V

9	a)	Explain briefly about torsional interaction, transient torque problem and discuss their counter measures?	[7M]
	b)	Explain in detail sub synchronous resonance problems and counter measures?	[7M]
10	a)	What is the reason for the existence of SSSR in the steady state and transient	[7M]
	b)	Explain the voltage control using synchronous condensers.	[7M]

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COURSE OBJECTIVES:

The course should enable the students to:	
I	Illustrate basic concepts of extra high voltage AC transmission and understand the need for it
II	Outline the line and ground reactive parameters and voltage gradients of conductors.
III	Describe effects of corona and methods of associated measurement.
IV	Associate the knowledge of electro static field theory and traveling wave theory.
V	Select voltage control methods for extra high voltage AC transmission system.

COURSE OUTCOMES (COs):

CO 1	Student can learn about the trends in EHV AC transmission.
CO 2	Student can calculate the line inductance and capacitance of bundle conductors
CO 3	Student understands the effect of Corona and radio interference.
CO 4	Explore the concept of Electro static field and the travelling wave theory.
CO 5	Student can analyze compensated devices for voltage control.

COURSE LEARNING OUTCOMES (CLOs):

CLO Code	CLO's	At the end of the course, the student will have the ability to:
AEE504.01	CLO 1	Student shall learn the necessity of EHVAC Transmission.
AEE504.02	CLO 2	Student will come to know the advantages and problems in EHVAC Transmission.
AEE504.03	CLO 3	Student learns the power handling capability and line losses in EHVAC Transmission.
AEE504.04	CLO 4	Student understands the concept of bundle conductors.
AEE504.05	CLO 5	Student can calculate line inductance.
AEE504.06	CLO 6	Student can calculate line capacitance
AEE504.07	CLO 7	Student learns the concept of sequence inductance and sequence capacitance.
AEE504.08	CLO 8	Student learns the concept of sequence inductance and sequence capacitance.
AEE504.09	CLO 9	Student learns different modes of propagation and ground return.
AEE504.10	CLO 10	Student can calculate gradient of bundle conductors.
AEE504.11	CLO 11	Student can solve various design examples.
AEE504.12	CLO 12	Student learns about the concept of power loss and audible noise due to Corona.
AEE504.13	CLO 13	Student can derive the formula for corona loss .
AEE504.14	CLO 14	Student can understand the relationship between single phase and three phase audible noise levels.
AEE504.15	CLO 15	Student learns the concept of radio interference.

CLO Code	CLO's	At the end of the course, the student will have the ability to:
AEE504.16	CLO 16	Student can calculate electrostatic field of EHV transmission lines.
AEE504.17	CLO 17	Understand the effect of electrostatic field on humans ,animals and plants.
AEE504.18	CLO 18	Student can estimate the electrostatic induction in un-energized circuit of double ,circuit line.
AEE504.19	CLO 19	Student can derive travelling wave expression and its solution
AEE504.20	CLO 20	Student learns about source of excitation and terminal conditions.
AEE504.21	CLO 21	Student learns about power circle diagram and its uses.
AEE504.22	CLO 22	Student understands the concept of synchronous condenser.
AEE504.23	CLO 23	Student learns the concept of static VAR compensation.

MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No		Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	AEE504.01	Student shall learn the necessity of EHVAC Transmission.	CO 1	Understand
	b	AEE504.02	Student will come to know the advantages and problems in EHVAC Transmission.	CO 1	Understand
2	a	AEE504.01	Student shall learn the necessity of EHVAC Transmission.	CO 1	Remember
	b	AEE504.02	Student will come to know the advantages and problems in EHVAC Transmission.	CO 1	Analyzing
3	a	AEE504.03	Student learns the power handling capability and line losses in EHVAC Transmission.	CO 2	Understand
	b	AEE504.04	Student understands the concept of bundle conductors.	CO 3	Understand
4	a	AEE504.05	Student can calculate line inductance.	CO 2	Understand
	b	AEE504.06	Student can calculate line capacitance	CO 2	Understand
5	a	AEE504.07	Student learns the concept of sequence inductance and sequence capacitance.	CO 3	Analyzing
	b	AEE504.06	Student can calculate line capacitance	CO 3	Understand
6	A	AEE504.08	Student learns the concept of sequence inductance and sequence capacitance.	CO 3	Understand
	b	AEE504.09	Student learns different modes of propagation and ground return.	CO 3	Understand

7	a	AEE504.10	Student can calculate gradient of bundle conductors.	CO 4	Remember
	b	AEE504.09	Student learns different modes of propagation and ground return.	CO 4	Understand
8	a	AEE504.10	Student can calculate gradient of bundle conductors.	CO 4	Understand
	b	AEE504.11	Student can solve various design examples.	CO 4	Understand
9	a	AEE504.12	Student learns about the concept of power loss and audible noise due to Corona.	CO 5	Analyzing
	b	AEE504.12	Student learns about the concept of power loss and audible noise due to Corona.	CO 5	Understand
10	a	AEE504.12	Student learns about the concept of power loss and audible noise due to Corona.	CO 5	Understand
	b	AEE504.13	Student can derive the formula for corona loss .	CO 5	Understand

Signature of Course Coordinator **HOD, EEE**