Code No: 118BH

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, April - 2018

EHV AC TRANSMISSION

(Electrical and Electronics Engineering)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a)	What is the necessity of EHV AC Transmission?	[2]
b)	What are the advantages and disadvantages of EHV AC Transmission?	[3]
c)	Explain the field of line charges.	[2]
d)	What are the properties of field of line charges?	[3]
e)	What do you understand by audible noise on over head transmission lines?	[2]
f)	What are the methods to reduce corona loss in EHV AC transmission?	[3]
g)	What is the concept of Electrostatic field in the case of EHV AC transmission?	[2]
h)	Briefly explain electromagnetic interference of EHV AC transmission.	[3]
i)	What is the use of power circle diagram for voltage control?	[2]
j)	Mention various voltage control methods for EHV AC transmission.	[3]

PART - B

(50 Marks)

2.a) Explain the effect of resistance of conductor in EHV AC transmission system.
b) Explain the power handling capability and line losses in EHV lines and discuss the useful conclusions from it. [5+5]

OR

3.a) Develop the expression for inductances for the three modes propagation of the electromagnetic energy of the waves generating them.
b) Explain in detail capacitances and inductances of ground return and derive necessary expressions. [5+5]

4.a) Explain the properties of the field of a point charge.
b) Explain surface voltage gradient on conductors in a bundle. [5+5]

OR

5.a) Explain the maximum charge condition on a 3-phase line.
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. [5+5]

6.a) Explain the generation and measurement of audio noise due to corona in EHV lines.
b) Discuss the limits for radio interference fields in EHV transmission lines. [5+5]

OR

7.a) List out different corona loss formulae and explain each one.
b) Discuss the frequency spectrum of the radio interference field produced in a EHV line. [5+5]

8.a) What are the effects of high electrostatic fields on biological organisms and human beings.
b) Discuss the effects of electrostatic induction on un energized circuit of a double circuit 3-phase A.C. line. [5+5]

OR

9.a) Explain the behavior of a traveling wave when it is reflected from the terminal inductance.
b) A 132 kV transmission line having a surge impedance of 450 ohms terminates at a 7.5 MVA, 132/33 kV transformer which may represented by a lumped inductor of 15 mH and lumped capacitance of 0.03 μF in parallel. A rectangular surge of 1500 kV travels along the line towards the transformer. Calculate the refracted voltage into the transformer when the incident wave reaches the transformer terminals. [5+5]

10.a) What is the reason for the existence of SSSR in the steady state and transient conditions in series capacitor compensated lines?
b) Explain the voltage control using synchronous condensers. [5+5]

OR

11.a) List the dangers resulting from series capacitor compensation on long lines, and the remedies taken to counteract them.
b) Explain in detail sub synchronous resonance problem and counter measures. [5+5]

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