

R13

Code No: 118BH

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 overhead 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]

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- 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 an 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 be represented by a lumped inductor of 15 mH and lumped capacitance of 0.03 μ F 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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