R13

Code No: 118BH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, June - 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 are the problems associated with EHV transmission?	[2]
b)	What are the properties of bundled conductors?	[3]
c)	What is meant by voltage gradient?	[2]
d)	Give an expression for potential relations for multi-conductors.	[3]
e)	What are the characteristics of audible noise (AN) in EHV AC transmission?	[2]
f)	How can we measure the audible noise (AN) in EHV AC transmission?	[3]
g)	Explain electromagnetic interference.	[2]
h)	Write traveling wave expression on EHV AC transmission.	[3]
i)	What are the advantages of series compensation?	[2]
j)	How can we achieve voltage control by using static VAR compensation?	[3]

PART - B

(50 Marks)

2.a) Derive the expression for inductance of a Multi conductor line used in EHV AC transmission line.
b) Discuss why EHV AC lines are necessary to transmit large blocks of power over long distances. [5+5]

OR

3.a) Prove that a one 750 KV line power handling capacity of a.c. transmission line arry as much power as four 400 KV circuits for equal distance of transmission.
b) Explain different mechanical considerations that are taken in to account for transmission line performance. [5+5]

4.a) Explain the field of line charges and their properties.
b) Explain the importance of surface voltage gradient factors in extra high voltage lines. [5+5]

OR

5.a) Determine the field of sphere gap in EHV AV system.
b) Describe the charge-potential relations of a transmission line with *n* conductors on a tower. [5+5]

6.a) State the different factors that affect the Audible noise generated in EHV AC Line.
b) Derive the relation between single phase and three phase audible noise level. [5+5]

OR

7.a) Describe the mechanism of formation of positive corona pulse train.
b) Explain frequency spectrum of radio noise in EHV AC transmission lines. [5+5]

8.a) Obtain electrostatic fields of single circuit 3-phase EHV line.
b) Derive the expression for charging current and MVAR rating of EHV lines. [5+5]

OR

9.a) Obtain the reflection and refraction of travelling waves.
b) Calculate the expected per unit value of load-end voltage for various line lengths from 100 km to 1000 km at no load. Neglect line resistance and assume source-end voltage to be held constant at 1 per unit. [5+5]

10.a) A 750 KV line has the distributed line constants r – 0.025 ohm/Km, L = 0.9 mH/Km and C = 12.3 nF/Km at 50 Hz; Calculate the following if the line is 600 Km in length:
i) A, B, C, D constants.
ii) The charging current and MVAR at the receiving end voltage of 750 KV (L-L) on no-load.
b) Explain the voltage control by using static VAR compensating system. [5+5]

OR

11.a) Compare series and shunt compensation for EHV AC transmission.
b) A 420 kV line is 750 km long. Its inductance and capacitance per km are L = 1.5 mH/km and C = 10.5 nF/km. The voltages at the two ends are to be held 420 kV at no load. Neglect resistance. Calculate the MVAR of shunt reactors to be provided at the two ends and at intermediate station midway with all four reactors having equal resistance. [5+5]

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