Code No: 137CD **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, July/August - 2023

EHV AC TRANSMISSION SYSTEMS

(Electrical and Electronics Engineering)

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

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Define bundle conductor GMR.	[2]
b)	State the disadvantages of EHV AC Transmission system.	[3]
c)	What do you understand by ground return?	[2]
d)	What are the sequence inductances?	[3]
e)	What is corona?	[2]
f)	What is frequency spectrum?	[3]
g)	What is electromagnetic interference?	[2]
h)	What is charging current?	[3]
i)	What is the use of power circle diagram?	[2]
j)	Explain sub synchronous resonance in series capacitor.	[3]

PART – B

(50 Marks)

2.a) What is the necessity of EHV AC transmission lines?

b) A Power of 2000 MW is to be transmitted from a super thermal power station over 800 km long. Use 400 kV and 750 kV alternatives. Suggest the number of circuits required with 50% series capacitor compensation and calculate the total power loss and loss per km.[4+6]

OR

3.a) Explain skin effect on resistance in round conductors.

b) Describe the properties of bundled conductors with necessary expressions. [5+5]

4. Describe the line parameters for modes of propagation with necessary expressions. [10]

OR

5.a) Obtain the surface voltage gradient on 2-conductor bundle.

b) An isolated sphere in air has a potential V and radius R. Calculate the charge of radius 0.5 m. Calculate the charge to be placed at its centre to make the surface of the sphere an equipotentail. [5+5]

6.a) Explain the generation and characteristics of audible noise.

b) An overhead conductor of 1.6 cm radius is 10 m above ground. The normal voltage is 133 kV r.m.s to ground (230 kV, line to line). The switching surge experienced is 3.5 p.u. Taking K =0.7, calculate the energy loss per km of line. Assume smooth conductor.[5+5]

OR

7.a) Explain the limits for radio interference fields.

b) A test object for 400 kV is undergoing an RIV test. The coupling capacitor has 1000 pF and the voltage across the measuring system is to be 1 volt. Calculate the value of inductance required if V = 243.5 kV per phase. [4+6]

8.a) Derive traveling wave expression and solution with necessary diagrams.

b) A transmission line has L = 1 mH/km and C = 11.11 nF/km. The conductor plus ground resistance amount to 0.4 ohm/km. Taking only a single phase representation, calculate (i) the velocity of propagation, (ii) the surge impedance, (iii) the attenuation factor for 400 km in Neper and dB, (iv) the maximum value of open end voltage. [5+5]

OR

9. Discuss the electrostatic induction in undersigned circuit of double circuit time. [10]

10. Explain the voltage control using synchronous condensers. [10]

OR

11. Derive the generalized equations for shunt reactor compensation of very long line with intermediate. [10]

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