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MODEL QUESTION PAPER

B.E. Electrical and Electronics Engineering

Fifth Semester

EE335 – Transmission and Distribution

Time : 3 Hours Max Marks : 100

PART – A

Answer All Question (10 x 2 = 20 marks)

1. Mention the advantages of using ACSR conductor as overhead line.
2. What are stranded conductors? Why is it used?
3. Discuss skin and proximity effects?
4. Explain changing current of a transmission line.
5. Draw equivalent circuit and phasor diagram for short transmission line.
6. What is the nature of reactive power compensation for peak load and off peak load conditions?
7. Give reason for using a greater number of insulator discus for transmission lines placed in heavily polluted areas.
8. Compare the power transmission using overhead line and underground cable.
9. Discuss various factors affecting sag.
10. Write briefly about conservation of energy.

PART – B (5 x 16 = 80 Marks)

11.i) Explain the different types of HVDC links and state the advantages of HVDC transmission over AC transmission.

ii) Explain why the transmission lines are 3 phase 3-wire circuits while distribution lines are 3 phase 4-wire circuits.

12.a) Derive an expression for inductance

i) of a single-phase overhead line.

ii) A conductor is composed of seven identical copper strands each having a radius r. Find the self-GMD of the conductor.

OR

12.b)i) Derive an expression for the capacitance between conductors of a single-phase overhead line.

ii) Find the capacitance between the conductors of a single-phase 10 km long line. The diameter of each conductor is 1.213cm. The spacing between conductors is 1.25m. Also find the capacitance of each conductor neutral.

13.a)i) Show that the real power transferred is dependent on the power angle and the reactive power transferred is dependent on the voltage drop in the line.

ii) The constants of a 3-phase lines are $A=0.9\angle 2°$ and $B=140\angle 70°\ \Omega$ / phase. The lines delivers 60 MVA at 132 kV and 0.8 pf lagging. Draw circle diagrams and find.

i. sending end voltage and power angle.
ii. The maximum power, which the line can deliver with the above values of sending end and receiving end voltages.
iii. Sending end power and power factor.
iv. Line losses.

OR

13.b)i) What is an equivalent π circuit of long line? Derive expression for parameters of this circuit in terms of line parameters.

ii) A 50Hz transmission line 300 km long total series impedance of 40+j25 Ω and total shunt admittance of 10^{-3} mho. The 220 Kv with 0.8 lagging power factor. Find the sending end voltage, current, power and power factor using nominal π method.

14.a)i) What are different methods to improve string efficiency of an insulator?

ii) In a 3-unit insulator, the joint to tower capacitance is 20% of the capacitance of each unit. By how much should the capacitance of the lowest unit be increased to get a string efficiency of 90%. The remaining two units are left unchanged.

OR

14.b)i) Derive the expression for insulator resistance, capacitance and electric stress in a single core cable. Where is the stress maximum and minimum?

ii) A single core 66kv cable working on 3-phase system has a conductor diameter of 2cm and sheath of inside diameter 5.3cm. If two inner sheaths are introduced in a such a way that the stress varies between the same maximum and minimum in the three layers find:

1. position of inner sheaths
2. voltage on the linear sheaths
3. maximum and minimum stress

15.a)i) Derive the expressions for sag and conductor length under bad weather conditions. Assume shape of overhead line is a parabola.

ii) An overhead line has a span of 300m. The conductor diameter is 1.953cm and the conductor weight is 0.844kg/m. Calculate the vertical sag when a wind pressure is 736 N/sq.m of projected area acts on conductor. The breaking strength of conductor is 77990N and the conductor should not exceed half the breaking strength.

OR

15.b)i) Explain different types Traiff.

ii) Why a consumer having low power factor is changed at high rates.