Reg. No. :

Question Paper Code : X 10395

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020/
APRIL/MAY 2021
Fourth Semester
Electrical and Electronics Engineering
EE 8402 – TRANSMISSION AND DISTRIBUTION
(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is Bundled conductor ? Write its advantages over Solid Conductors.
2. What is Skin effect ? How Skin effect depends upon the frequency of the circuit ?
3. Draw the phasor diagram of a nominal T-transmission network with proper notations.
4. What is Surge Impedance Loading (SIL) ?
5. What is a stringing chart and sag template ?
6. Define String efficiency.
7. What is the difference between capacitance grading and intersheath grading for a underground cable ?
8. How is leakage resistance is different from resistance of core in a cable ?
9. What is meant by Distribution system and what is the purpose of the 4^{th} wire in a 3-ϕ, 4 wire secondary distribution system ?
10. What are the different types of HVDC links ?

PART – B **(5×13=65 Marks)**

11. a) What do you mean by transposition ? Write its advantages. Derive the expression for the inductance of a 3-ϕ circuit where the conductors are present on the vertices of a triangle having distances D_1, D_2 and D_3. **(3+3+7)**

(OR)

b) A double circuit 3-ϕ line has its conductor at the vertices of a regular hexagon as shown in the Figure 1. The conductor radius of 1.25 cm. Find the capacitance per phase per km and charging current. **(8+5)**

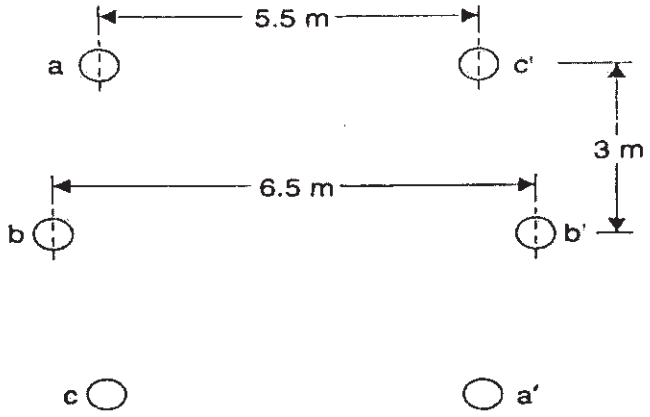

Figure 1

12. a) i) Draw the phasor diagram for short transmission line. Derive the approximate expression for the sending end voltage using the phasor diagram.

ii) A 15 km long 3-phase line has a resistance of 5.31 ohms per phase and inductive reactance of 5.54 ohms per phase. The sending end voltage is 11 kV. The receiving end load is 1200 kW at a power factor of 0.8 lagging. Find the receiving end voltage and line current. **(5+8)**

(OR)

b) A 200 km long 3-phase overhead line has a resistance of 48.7 ohms per phase, inductive reactance of 80.20 ohms per phase and capacitance of (line to neutral) 8.42 nF per km. It supplies a load of 13.5 MW at a voltage of 88 kV and power factor 0.9 lagging. Using nominal T-circuit, find the sending end voltage, current, regulation and power angle. **(3+3+4+3)**

13. a) A three-unit insulator string is fitted with a guard ring. The capacitances of the link pins to metal work (tower) and guard ring can be assumed to be 15% and 5% of the capacitance of each unit. Determine the voltage distribution and string efficiency. **(8+5)**

(OR)

b) What is the expression for sag and tension for a overhead transmission line when the supports are at unequal-level ? Explain the effect of ice and wind. **(8+5)**

14. a) What are the advantages of underground cable compared to overhead transmission line ? Explain the construction of a cable with a neat sketch diagram. **(5+8)**

(OR)

b) The inner conductor of a concentric cable has diameter of 1 cm with insulation of diameter 5 cm. The cable is insulated with two material having relative permittivity 4 and 2.5 with corresponding to safe working stress of 60 kV/cm and 50 kV/cm. Calculate the radial thickness of insulating layer and safe working voltage of the cable. **(8+5)**

15. a) What is Kelvin's law and how it is helpful to choose economic size of line conductor ? Discuss with its limitations. **(5+8)**

(OR)

b) Discuss the advantages and disadvantages of D.C. transmission over A.C. **(8+5)**

PART – C **(1×15=15 Marks)**

16. a) A two wire DC distributor AB, 600 m long is loaded as under given specification :

Distance from A(meter) :	150	300	350	450
Loads in Ampere :	100	200	250	300

The feeding point A is maintained at 440 V and B at 430 V and if each conductor has a resistance of 0.1Ω per 100 m, calculate (i) current supplied from A to B (ii) power dissipated in the distributor. **(8+7)**

(OR)

b) The towers of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg, find the minimum clearance of the conductor and water between the supports. Weight of the conductor is 1.5 kg/m. Bases of the towers can be considered to be at water level. **(15)**

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