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**Question Paper Code : 40488**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 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 Proximity effect?
2. What is Skin effect? Comment on skin effect of stranded conductor with respect to solid conductor.
3. In any transmission line,  $AD - BC = ?$
4. It is desirable that voltage regulation of a transmission line should be low. True or False.
5. What happen to tension, if the sag in an overhead line increases.
6. If shunt capacitance is reduced, what will happen to string efficiency?
7. Why the voltage drop in cable system is less than that of equivalent over head lines?
8. How is leakage resistance is different from resistance of core in a cable?
9. What do you mean by Ring Distributor? What are the main advantages of it?
10. What are the different types of HVDC links?

PART B — (5 × 13 = 65 marks)

11. (a) Derive an expression for loop inductance of a single phase line.

Or

- (b) Find the inductance per phase per km of double circuit 3 phase line shown in figure.11(b). The conductors are transposed and are of radius 0.75 cm each. The phase sequence is ABC.

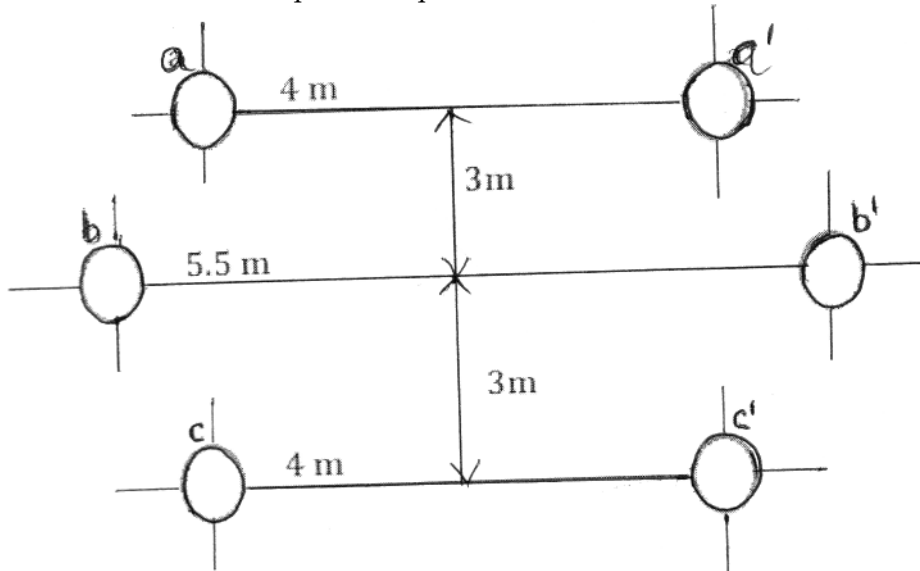


Figure. 11(b)

12. (a) Show how regulation and transmission efficiency are determined for medium lines using nominal  $\pi$  method. Illustrate with suitable vector diagrams.

(4+4+5)

Or

- (b) A 3 phase, 220 KV, 50Hz transmission line consists of 1.5cm radius conductor spaced 2 meter apart in equilateral triangular formation. If the temperature is 40° c and atmospheric pressure is 76 cm, calculate the corona loss per km of the line. Take  $M_0 = 0.85$ .
13. (a) It is required to grade a string having seven suspension insulators. If the pin to earth capacitance are all equal to C, determine the line to pin capacitance that would give the same voltage across each insulator of the string.

(3+2+2+2+2+2)

Or

- (b) A transmission line has a span of 150 m between level support. The conductor has a cross sectional area of 2 cm<sup>2</sup>. The tension in the conductor is 2000 kg. If the specific gravity of the conductor material is 9.9 gm/cm<sup>3</sup> and the wind pressure is 1.5 kg/m length, calculate the sag. What is vertical sag.

(8 + 5)

14. (a) What is insulation resistance of a cable? Derive an expression for the insulation resistance of a single core cable. (4+9)

Or

- (b) A 33 kv single core cable has a conductor diameter of 1 cm and a sheath of inside diameter 4 cm, Find the maximum and minimum stress in the insulation. (7+6)

15. (a) A single phase distributor 2km long supplies a load of 120 A at 0.8 p.f. lagging at its far end and a load of 80A at 0.9 p.f. lagging at its mid-point. Both power factors are referred to the voltage at the far end. The resistance and reactance per km (go and return) are 0.05 ohm and 0.1 ohm respectively. If the voltage at the far end is maintained at 230V, calculate (i) voltage at the sending end, (ii) phase angle between voltage at the two ends. (9 +4)

Or

- (b) What are the causes of low Power factor? Discuss the disadvantages of low power factor in an AC. systems. (5 +8)

PART C — (1 × 15 = 15 marks)

16. (a) The cost of a 3 phase overhead transmission line is Rs (25000a + 2500) per km, where a is the area of cross section of each conductor in cm<sup>2</sup>. The line is supplying a load of 5 MW at 33 kV and 0.8 p.f lagging assumed to be constant throughout the year. Energy costs 4 paise per kwh and interest and depreciation total 10% per annum. Find the most economical size of the conductor. Given that specific resistance of conductor material is 10<sup>-6</sup> ohm cm.

Or

- (b) What do you understand by generalized circuit constants of a transmission line? What is their properties? Evaluate the generalized circuit constants for a medium line – nominal T method. (4+4+7)