SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E - EEE
Title of the paper: Transmission & Distribution
Semester: V Max. Marks: 80
Sub.Code: 214506 Time: 3 Hours
Date: 02-05-2008 Session: AN

PART – A (10 x 2 = 20)

Answer All the Questions

1. Give four advantages of EHVAC Transmission.
2. State Kelvin's Law? And discuss its limitations.
3. What do you understand by the constants of an overhead transmission line?
4. What is skin effect? Why is it absent in the d.c. system?
5. List out two advantages and disadvantages of corona.
6. What do you understand by medium transmission lines? How capacitance effects are taken in to account in such lines?
7. Define Thermal Resistance of a Cable.
8. Define and explain string efficiency. Can its value be equal to 100%.
9. What is a sag in overhead lines?
10. Why are Dampers preferred for high voltage power lines?

PART – B (5 x 12 = 60)

Answer All the Questions

11. What is electric power supply system? Draw and explain a single line diagram of a typical a.c supply scheme.

(or)

12. (a) What are the advantages and disadvantages of d.c transmission over a.c transmission? (8)
(b) How will you determine the economic transmission voltage? (4)

13. Derive an expression for the inductance per phase for a three phase overhead transmission line.
(a) When conductors are symmetrically placed.
(b) Conductors are unsymmetrically placed but line is completerly transposed.

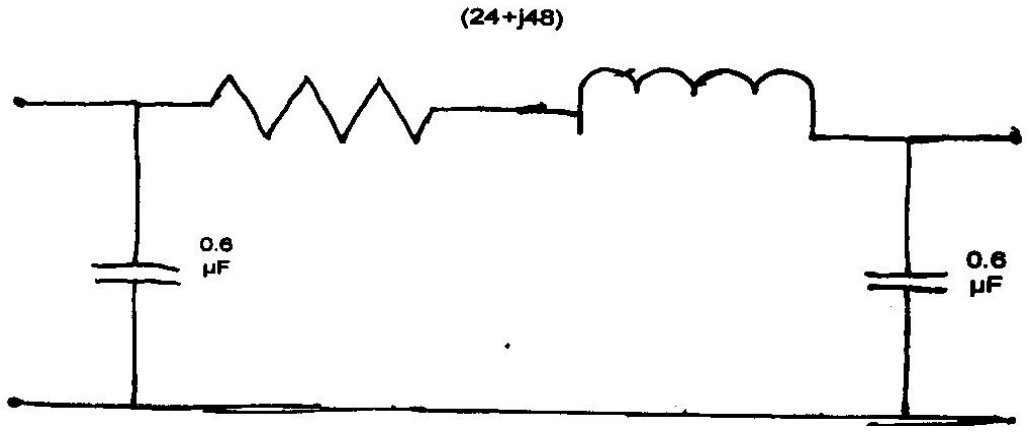
(or)

14. (a) A 3-phase, 50Hz, 66kV overhead line conductors are placed in a horizontal plane as shown in fig (i) the conductor diameter is 1.25cm. If the line length is 100 km, calculate.
(i) Capacitance per phase (ii) Charging current per phase, assuming complete transposition of line.

•← 2m →•← 2.5m →•

(b) Calculate the inductance of each conductor in a 3-phase, 3-wire system when the conductor are arranged in a horizontal plane with spacing such that D_{31} = 4m; D_{12} = D_{23} = 2m. The conductors are transposed and have a diameter of 2.5 cm.

15. (a) Explain the procedure for determining the transmission efficiency and voltage regulation of a long transmission line. (5)
(b) Determine the sending end voltage for following, using Normal π method. The transmission line is 120 km long and delivers 40MW at 132Kv and 0.8 p.f. lagging. (7)



(or)

16. Explain various steps involved in receiving end power circle diagram, with neat sketches.

17. (a) Explain the constructional feature of one LT and HT cable.
(b) A cable is graded with three dielectrics of permittivities 4,3 and 2 The maximum permissible potential gradient for all dielectricals is same and equals to 30K v/cm. The core diameter is 1.5cm and sheath diameter is 5.5 cm.

(or)

18. (a) Show that maximum stress in a single-core cable is 2 v/d $\log_e$ D/d where V is the operating voltage and d and D are the conductor and sheath diameter. (5)
(b) A string of 4 insulators has a self-capacitance equal to 10 times the pin to earth capacitance. Find (i) the voltage distribution across various units expressed as a percentage of total voltage across the string and (ii) String efficiency. (7)

19. With neat sketches, explain how you will derive the Expression for the sag of an overhead transmission line, under various effects of atmospheric conditions.

(or)

20. (a) A transmission line has a span of 200metres between level supports. The conductor has a cross-sectional area of 1.29 cm^2, weighs 1170 kg/km and has a breaking stress of 4218 kg/cm^2. Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square meter of projected area. What is the vertical sag? (8)
(b) Deduce an approximate expression for sag in over head lines when supports are at unequal levels. (4)