SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E-EEE

Title of the Paper: Transmission & Distribution   Max. Marks: 80

Sub. Code: 414506   Time: 3 Hours

Date: 23/11/2010   Session: FN

PART - A   (10 X 2 = 20)
Answer ALL the Questions

1. Draw a single line diagram of a typical AC power supply scheme.
2. State Kelvin's law.
3. What is skin effect? Why is it absent in DC system?
4. What is inductive interference?
5. What is transmission efficiency?
6. What is Ferranti effect?
7. Name the insulating materials used in underground cables?
8. List out the methods of improving string efficiency.
9. List out the causes of over voltage.
10. What are the requirements of a good lightning arrester?

PART-B   (5 X 12 = 60)
Answer All the questions

11. An Electric train moves between two sub-stations 8km, apart and draws a constant current of 600A.The two substations are maintained at a potential of 580V and 575V respectively .The resistance for both go and return path is 0.05Ω per km. Calculate the minimum potential , the point where it will occur and the currents supplied by each sub-station at that instant.

(or)

12. Explain electrical layout and bus-bar arrangements in sub-station.

13. Derive an expression for the inductance per phase for a 3-phase overhead transmission line when conductors are unsymmetrically placed but the line is completely transposed.

(or)

14. A 3 phase , 220 KV ,50 Hz transmission line consists of 1.5 cm radius conductor spaced 2 meters apart in equilateral triangular formation . If the temperature is 40ºC and atmospheric pressure is 76cm, Calculate the corona loss per km of the line.Take m_o=0.85

15. A 3-Phase , 50 Hz transmission line 100 km long delivers 20MW at 0.9 p.f lagging and at 110KV .The resistance and reactance of the line per phase per km are 0.2Ω and 0.4Ω respectively , while capacitive admittance is 2.5 X 10 $^{-6}$ siemens/km/phase Calculate

(i) the current and voltage at the sending end

(ii)efficiency of transmission .Use nominal T method.

(or)

16. Discuss the importance of voltage control in power system and explain the following with a neat sketch.

i)on –load tap changing transformer.

ii)off-load tap changing transformer.

iii)Auto-transformer tap changing.

17. (a) Explain the methods of inter sheath grading of cables.

(b) Calculate the capacitance and charging current of a single-core cable used on a 3-phase 66KV system. The cable is one km long having a core diameter 15cm and sheath diameter 60cm. The relative permittivity of the insulation may be taken as 3.6 and the supply frequency is 50 Hz.

(or)

18. The self capacitance of each unit in a string of three suspension insulation is C. the shunting capacitance of the connecting metal work of each insulator to earth is 0.15C while for line it is

0.1C.Calculate (i) The voltage across each insulator as a percentage of the line voltage to earth (ii) string efficiency.

19. Write short notes on:
      (a) Rod gap arrester.
      (b)Horn gap arrester.
      (c)Multi gap arrester.

(or)

20. Explain in detail about the AVC grounding protection by Peterson coil method.