A 264

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Fifth Semester

Electrical and Electronics Engineering

EE 335 — TRANSMISSION AND DISTRIBUTION

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the practical transmission and distribution voltage levels, commonly used.

2. What are the various types of HVDC systems?

3. Write the expression for the capacitance of a three phase line with unsymmetrical spacing.

4. On what factors does the proximity effect depends?

5. Define "Ferranti Effect". What is the reason behind this Ferranti effect.

6. What is meant by "surge impedance loading"? Also give its expression.

7. Give the importance of stay insulators.

8. List out four main insulating materials used in cables.

9. Define "Factor of safety".

10. What do you mean by conservation of Energy?

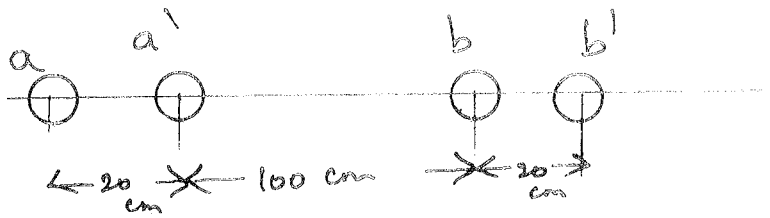
PART B — (5 × 16 = 80 marks)

11. (i) Explain the effect of High voltage on volume of copper and on efficiency. (8)

(ii) With a neat sketch, explain about ring main distribution system. (8)

12. (a) (i) Derive the inductance of a three phase transmission line with unsymmetrical spacing. (8)

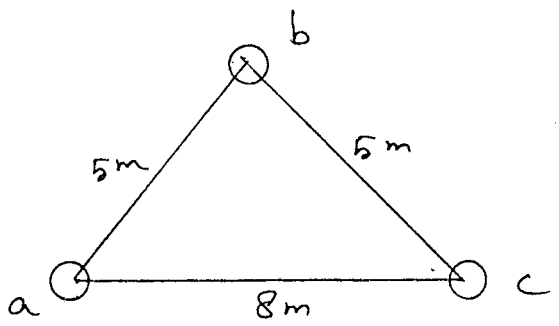
(ii) In a single phase line as shown in Fig. conductors a and a' in parallel form one conductor while b and b' in parallel form the return path. Calculate the total inductance of the line per Km, assuming the current is equally shared by the two parallel conductors. Conductor dia is 2.0 cm. (8)



Or

(b) (i) Write short notes on "Inductive interference with neighbouring circuits". (6)

(ii) A single circuit, three phase, 50 Hz transmission line consists of three conductors as shown in Fig. If the conductors have diameter of 0.8 cm, find the inductance and capacitance of the transmission line. (10)



13. (a) (i) A three phase transmission line has the following data : (10)

Resistance of each conductor = 20 ohm

Inductive reactance of each conductor = 40 ohm

Capacitive susceptance to neutral = 0.004 mho

Load at the receiving end = 12,500 kNA at 0.8 p.f. lagging.

Voltage at the receiving end = 66 kV.

Find :

(1) Sending end voltage and current

(2) Sending end power factor

(3) Efficiency

(4) Regulation of the line.

Use Nominal "T" method.

(ii) Write short notes on "Corona loss". (6)

Or

(b) (i) Explain the procedure for finding the transmission efficiency and voltage regulation of a long transmission line. (8)

(ii) Briefly explain about the shunt and series line compensation. (8)

14. (a) (i) What are the various properties of Insulators? Also briefly explain about suspension type Insulators. (8)

(ii) Calculate the most economical diameter of a single core cable to be used on 132 kV, 3 phase system. Find also the overall diameter of the insulation, if the peak permissible stress is not to exceed 60 kV/cm. Also derive the formula used here. (8)

Or

(b) (i) Briefly explain about various types of cables used in underground system. (8)

(ii) A string of 4 insulator units has a self capacitance equal to 4 times the pin to earth capacitance calculate :

(1) voltage distribution as a % of total voltage. (8)

(2) String efficiency.

15. (a) (i) An overhead transmission line at a river crossing is supported from two towers of span of 250 m. The conductor has a diameter of 1.42 cm and has a weight of 1.09 kg. The line is subjected to a wind pressure of 37.8 kg/m^2 of the projected area. The radial thickness of ice is 1.25 cm. Calculate the sag. Assume a maximum working stress of 1050 kg/cm^2. One cubic metre of ice weighs 913.5 kg. (10)

(ii) Write short notes on Energy couservation in Transmission and distribution. (6)

Or

(b) Write short notes on :

(i) Sag template. (6)

(ii) Various types of Tarrifs. (5)

(iii) Economic factors governing energy conservation program. (5)