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B. Tech. V Sem. (Main/Back) Exam., Nov.-Dec.-2016
Electrical & Electronics Engineering
5EX5A Transmission & Distribution of Electrical Power

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks Back: 24

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. <u>NIL</u>

2. <u>NIL</u>

UNIT – I

Q.1 (a) What is meant by the terms feeder, distribution and service mains? Why the distribution by A.C. is Considered to be superior to that by D.C.? [8]

(b) Prove that the volume of conductor required in a transmission system is inversely proportional to the square of the voltage as well as power factor of the load. State the condition under which this statement is true. [8]

OR

Q.1 (a) Compare DC 2 – wire and DC – 3 wire. [6]

(b) Explain the radial and ring main distribution system. [10]

UNIT – II

Q.2 (a) Derive an expression for sag of a line supported between two supports of same height. [8]

(b) What is meant by disruptive critical voltage and visual critical voltage? State the effects of conductor size, spacing and condition of the surface of conductor on these voltages. [8]

OR

Q.2 (a) Explain the necessity and method of preparing "Stringing charts" for over head transmission lines. [8]

(b) A transmission line has a span of 150m between level supports. The x – sectional area of the conductor is $1.25cm^2$ and weight 100kg per 100m. If the breaking stress is $4220kg/cm^2$, calculate the factor of safety if the sag of the line is 3.5m. Assume a maximum wind pressure of 100kg per sq. meter. [8]

UNIT – III

Q.3 (a) Prove that the inductance of a group of parallel wires carrying current can be represented in term of their geometric distance. Explain the meaning of the term "Self g.m.d. and Mutual g.m.d." [8]

(b) Explain skin and proximity effects. [8]

OR

Q.3 (a) Derive the capacitance of a three phase overhead line. [8]

(b) Derive an expression for capacitance of three phase transmission line with unsymmetrical spacing. [8]

UNIT – IV

Q.4 Explain the following:

(a) Corona power loss

(b) Electric stress between parallel conductors

OR

Q.4 (a) Derive an expression for the voltage induced in communication lines due to the current in power lines. [8]

(b) Find the value of A, B ,C and D in the following approximate methods interms of z and y. [8]

(i) Nominal π method

(ii) Nominal T – method

UNIT – V

Q.5 (a) A single core cable for use in 11kV, 50Hz system has conductor area of 0.645 cm² and the internal diameter of sheath is 2.18 cm. The permittivity of the dielectric used in the cable is 3.5. Find the maximum and minimum electrostatic stresses in the cable. [8]

(b) Explain any two methods of grading of cables with necessary diagram. [8]

OR

Q.5 Explain the following: [8+8=16]

(a) Oil filled and Gas filled cables

(b) Insulator resistance and capacitance calculation