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B. Tech 3rd Semester Examination

Transmission and Distribution of Electrical Power (N.S.)

EE-211

Time : 3 Hours   **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note :   Attempt five questions in all, select one question from each sections A, B, C and D. Section E is compulsory.

SECTION - A

1. (a)   Give a typical layout of a power system between place of generation and use of electrical power.   **(10)**

    (b)   Explain clearly the difference between feeder, distributer and service mains.   **(10)**

OR

2.   With neat line diagram explain radial, ring main and interconnected system.   **(20)**

SECTION - B

3. (a)   What is ferranti effect? Explain with the help of phasor diagram.   **(10)**

    (b)   Calculate the loop inductance per km of a single phase transmission line comprising of two parallel conductors one meter apart and 1.25 cm in dia. Also calculate the reactance of the transmission line when frequency is 50 Hz.   **(10)**

OR

4. Which factors govern the capacitance of transmission lines? Derive from first principle the capacitance per km to neutral of a 3-phase overhead transmission line with unsymmetrical spacing of conductors assuming transposition. **(20)**

SECTION - C

5. (a) What is stringing chart? How it can be prepared and mention its uses. **(10)**

   (b) In a string of three identical suspension insulator units supporting a transmission line conductor, if the self capacitance of each unit is defined as C farads, the capacitance of each connected pin to ground can be taken as 0.1 C farads. Determine the voltage distribution across the string if the maximum permissible voltage per unit is given as 20 kV. **(10)**

OR

6. (a) Obtain the expression for the sag of a transmission line supported by towers of different heights at its end. **(10)**

   (b) Give the appropriate locations where the (i) Pin type (ii) Suspension type (iii) Strain type and (iv) Egg type insulators can be used. **(10)**

SECTION - D

7. (a) Explain corona loss at extra high voltages and its disadvant ages.How is distruptive critical voltage estimated? **(10)**

   (b) A 3-phase, 220 kV, 50Hz transmission line consists of 1.2 cm radius conductor spaced 2 m at the corona of an equilateral triangle, calculate the distruptive critical voltage between lines. Irregularity factor 0.96; temperature 20°C. Barometric pressure 72.2 cm of mercury. Dielectric strength of air 21.1kV (rms)/cm. **(10)**

OR

8. (a) Explain the constructional features of HSL type oil filled power cable. **(10)**

(b) What do you understand by grading of cable? Explain, why grading is more of theoretical interest than practical? **(10)**

SECTION - E

9. Give answer in short.

(i) Why normally in our country OH distribution and transmission of electric energy is employed?

(ii) The efficiency of transmission, increases with the increase of the power factor. Justify.

(iii) What do you mean by dielectric strength of air?

(iv) Why it is preferable to use more than one conductor per phase rather than a solid or hollow conductor?

(v) How are insulators tested to determine flash-over voltages?

(vi) On what factors does the regulation of a transmission line depends?

(vii) What are the main requirements of good conductor material used for overhead lines?

(viii) Why glass insulators can not be used above 50 kV?

(ix) Why is galvanized steel wire not suitable for EHT lines for the purpose of transmitting large amount of power over a long distance?

(x) What is visual critical voltage? **(2×10=20)**