R16

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A
(25 marks)

1.a) What is the need for transposition of transmission lines? [2]
   b) Give brief about GMR and GMD and their significance. [3]
   c) Define surge impedance. [2]
   d) Classify and explain about transmission lines. [3]
   e) Define transient of power system. [2]
   f) Briefly explain about skin effect. [3]
   g) Give applications of sag template. [2]
   h) Write short notes on stringing chart. [3]
   i) What are the types of insulating materials used in cables? [2]
   j) Draw the neat sketch of a cable diagram and specify different parts of it. [3]

PART - B
(50 Marks)

2.a) Derive the inductance of a conductor due to internal flux.
   b) In a 3 phase transmission line the conductors are placed at the corners of an equilateral triangle of each side 2.5cm. If the radius of each conductor is 0.8cm find the inductance per phase per kilometer. [5+5]

OR

3. Derive the capacitance of a 3 phase unsymmetrical overhead transmission line with and without transposed. [10]

4.a) Derive the A, B, C and D constants for Nominal-T model.
   b) A single phase over head transmission line is delivering 600kVA load at 2kV.It's resistance and reactance are 0.18ohm and 0.36ohm per phase. Determine the voltage regulation if the load power factor is i) 0.8 P.F lag ii) 0.8 P.F lead. [4+6]

OR

5. Derive the A, B, C and D constants of long transmission lines using Rigorous solution. [10]

6.a) Explain about travelling or propagation of surges and derive the mathematical expression for it.
   b) How the corona forms in power systems and write the advantages and disadvantages.

   [5+5]

OR

7.a) Explain about Bewley's Lattice Diagram.
   b) Explain Ferranti effect in power systems. [5+5]

8.a) Derive the sag expression for a transmission line with the effect of ice covering and wind pressure.
   b) A transmission line has a span of 150m between level supports. The line conductor has a cross-sectional area of 1.25cm^2 and it weighs 120kg per 100 m. If the breaking stress of copper conductor is 4220 kg per cm^2. Calculate the maximum sag for a safety factor of 4. Assume maximum wind pressure of 90 kg per m^2. [5+5]

OR

9.a) Explain about the various methods to improve the string efficiency.
   b) With neat sketch explain about suspension type and strain type insulators. [5+5]

10.a) With neat sketch explain about construction of underground cable.
    b) Derive the formula of a capacitance of a single core cable. [5+5]

OR

11. Explain about different methods of grading of cables. [10]

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