

Exam. Code: 0934
Sub. Code: 33753

2056
B.E. (Electrical and Electronics Engineering)
Fourth Semester
EE-4404: Power Systems - I

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

- a) Explain skin effect in reference to overhead lines.
- b) Briefly explain types of conductors used in overhead transmission line.
- c) Explain the components of modern power systems with typical voltage levels.
- d) What do you mean by transposition in overhead lines?
- e) Why the transmissions lines are 3-phase, 3-wire circuit while distribution lines are 3-phase, 4 wire circuits. (5x2)

UNIT - I

II. a) Explain different layers of UGC with diagram. Discuss grading of UGC. Explain its different methods.

b) Derive inductance of a group of parallel wires carrying current. (2x5)

III. a) What bundled conductors and ACSR conductors? Discuss the advantages of both for overhead lines.

b) Explain reflection of travelling waves. Derive the formula for reflection coefficient. (2x5)

IV. a) Calculate the string efficiency of a string of three insulators units. The capacitance of each unit to earth and line be 20% and 5% of the self capacitance unit. Derive the formula used.

b) Define attenuation and distortion with reference to travelling waves. How is Bewley lattice diagram used to determine system voltage? (2x5)

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UNIT - II

- V. a) Derive the condition for maximum power transfer in transmission lines.
b) Explain the classification of lines based on their length of transmission. (2x5)
- VI. a) Derive ABCD constants for nominal π model of a medium transmission line.
b) Explain line loadability and discuss the surge impedance loading in details. (2x5)
- VII. a) What do you mean by Ferranti effect? Derive a simple expression for the voltage rise of an unloaded line.
b) Find the A, B, C, D parameters of a 3-phase, 80 km, 50Hz transmission line with series impedance of $(0.15+j0.78)$ ohm per km and a shunt impedance of $j5.0 \times 10^{-6}$ mho per km. (2x5)

x-x-x