Exam.Code:0934
Sub. Code: 6662

2053

B.E. (Electrical and Electronics Engineering)

Fourth Semester

PC-EE-402: Power System - 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. Assume any missing data.

x-x-x

I. Attempt the following:-

a) Write advantages of per unit representation of quantities.

b) Explain difference between self GMD and mutual GMD of transmission lines.

c) What are bundled conductors?

d) Give classification of transmission lines on the basis of length and voltage.

e) Explain AAAC conductors. (5x2)

UNIT - I

II. a) A string of 6 insulator units having self-capacitance equal to 10 times the pin-to-earth capacitance. Find: (i) voltage distribution across various units as a percentage of total voltage across the string, (ii) string efficiency.

b) What are stringing charts? Give its significance. (5,5)

III. a) How uniformity in dielectric stress in underground cables can be achieved? Explain the methods.

b) Calculate kVA taken by a 15 km long. 3-phase, 3-core cable, if the capacitance measured between any two cores in 0.2 μF/km when it is connected to 10 kV, 50 Hz bus-bar. (7,3)

IV. a) Explain reflection of travelling waves. Derive formula for reflection coefficient.

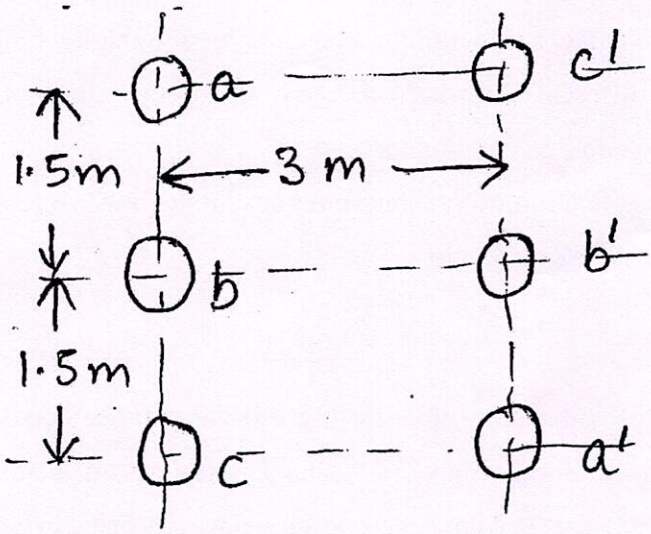
b) What is surge impedance? Evaluate surge impedance for 1-phase overhead transmission line with air as dielectric. (5,5)

P.T.O.

UNIT - II

V. a) Explain skin effect and proximity effect. How these can be avoided?

b) The arrangement of a symmetrical double-circuit, 3-phase line having six conductors is shown in figure. If the diameter of each conductor is 2.5 cm and the line is completely transposed, calculate inductive reactance per phase in ohms per km.



(3, 7)

VI. Determine the inductor per phase per km of a double-circuit 3-phase line. The radius of each conductor is 2 cm and the conductors are placed on the circumference of an imaginary circle of radius 7 m forming a regular hexagon figure. (10)

VII. A 220 kV, 3-phase, 150 km, 50 Hz transmission line delivers a load of 100 MW at 0.85 p.f. lagging. The line has per phase total impedance of Z= (40 +j 125) ohms and a total shunt admittance of Y= j0.001 mho. Determine: Sending end line voltage, Sending end current, Sending end power factor, transmission efficiency, percentage regulation, surge impedance loading.

Use Nominal-T method. (10)

x-x-x