

Exam. Code: 0933

Sub. Code: 6974

1108

B. Engg. (Electrical & Electronics Engg.)

4th Semester

EE-403: Power Systems-I (May-2017)

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Q. No. 1 which is compulsory and selecting atleast two questions from each Unit.

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- I. (a) What are bundled conductors? Where are they used?
(b) What is skin effect? How it can be reduced?
(c) What is effect of vibration on transmission lines?
(d) Why π - model is preferred over T-network is solving power system problems?
(e) What is characteristics impedance of a line? (5×2)

UNIT-I

- II. (a) Compare DC-3 wire & AC - 3 ϕ ,4 - wire system on the basis of copper requirement.
(b) What are the various causes of heating of cables? (5+5)
- III. (a) What are the various types of insulators? Discuss static shielding for equalizing potential across all units in a suspension type insulator.
(b) Discuss how capacitance is calculated in 3-cone belted cables between cores & sheath. (5+5)
- IV. (a) A transmission line conductor crossing a river is supported from two towers of height 40m & 90m above water level. The horizontal distance between the towers is 450m. If the tension is conductor is 1200kg and weight of conductor is 1.2 kg/m length. Find the minimum clearance of conductor and water and clearance mid-way between supports.
(b) Explain what is meant by the surge impedance of a line and show upon what factors it depends. Derive an expression for the same for a transmission line. (5+5)

UNIT-II

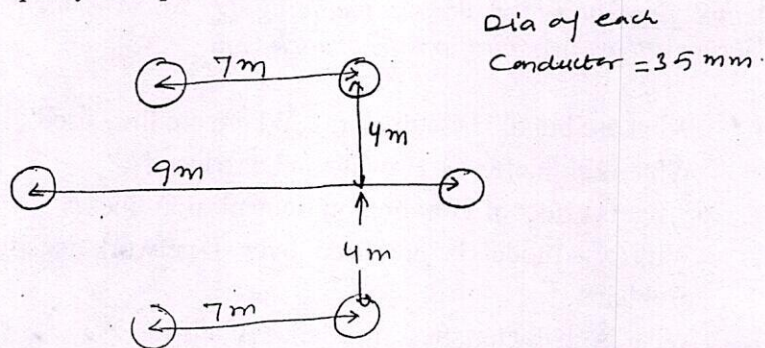
- V. (a) A 3 - ϕ overhead line delivers 4200kw at a power factor of 0.8 lagging to a load. If the sending end voltage is 33kv, and resistance and reactance of each conductor are 2.4μ and 6.5μ respectively. Determine:
(i) Receiving end voltage
(ii) Line current
(iii) Transmission η

P.T.O.

(2)

- (b) Derive an expression for a 3- ϕ unsymmetrical spaced conductors for inductance. (5+5)

- VI. (a) Find the charging current/km/conductor at 66kv, 50Hz assuming line is equally transposed



- (b) What is Ferrants Effect? What are problems associated with this? (7+3)

- VII. For a 3- ϕ phase T/m line, the following data is given. While the length of line is 300km.

| | | |
|-----------------------------------------------------|---|----------------------------|
| Voltage between lines | = | 400kv |
| Series impedance/phase | = | $200\angle 80^\circ \mu$ |
| Shunt admittance/phase | = | $0.001\angle 90^\circ \mu$ |
| Load delivered | = | 250 mw at 0.9 Pf lagging. |
| Determine sending end voltage, sending end current. | | (10) |