N – 625

Seat No.

T.E. (Electrical) (Semester – V) (New) Examination, 2011
POWER SYSTEM ANALYSIS

Day and Date : Tuesday, 10-5-2011   Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*

           *2) Assume suitable data if **necessary** and state clearly the **same**.*

           *3) Figures to the **right** indicate **full marks.***

SECTION – I

1. A) Derive an expression for the flux linkage :
    i) due to single current carrying conductor
    ii) in parallel current carrying conductors.   **8**

    B) A single-phase line has two parallel conductors 3 m apart. The radius of each conductor is 1.0 cm calculate :
    a) the loop inductance of the line / km.
    b) inductance and capacitance of each conductor / km.   **8**

2. A) Explain theory of formation of corona. Also explain the terms critical disruptive voltage, critical visual voltage.   **8**

    B) A three phase overhead transmission line is being supported by the three disc suspension insulators, the potentials across the first and second insulators are 8 KV and 11 KV respectively. Calculate :
    a) the line voltage
    b) the ratio of capacitance between pin and earth to self capacitance of each unit,
    c) the string efficiency.   **8**

3. A) Draw the single line diagram of a typical power system and discuss various power system elements.   **8**

   B) Explain different types of conductor materials used in power system.   **8**

P.T.O.

4. Write a short notes (**any three**) :　18
   a) Ring main A.C. distribution system
   b) Skin and proximity effect
   c) Different line supports
   d) Pin type Insulators.

SECTION – II

5. A) Derive expression for sending end voltage for a short transmission line with the vector diagram.　8

   B) Find the sending end voltage and voltage regulation of a 250 Km, three phase, 50 Hz, transmission line delivering 25 MVA at 0.8 lagging power factor to a balanced load at 132 KV. The line conductors are spaced equilaterally 3 m apart. The conductor resistance is 0.11 ohm/Km and its effective diameter is 1.6 cm. Neglect leakance. Use the nominal-π method.　8

6. A) Explain capacitance grading method of cable grading.　8

   B) Discuss different methods of laying underground cables.　8

7. A) Formulate Y_{BUS} matrix of given four bus system in fig. (a). Whereas line reactances are indicated in p.u.　8
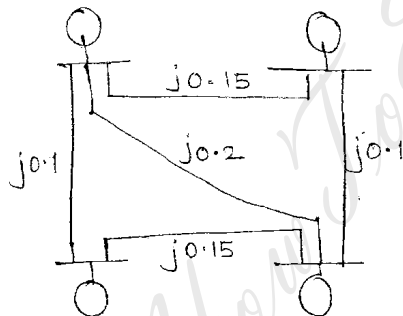
Fig (a)

   B) Explain load flow analysis using Gauss-Siedel method.　8

8. Write a short notes (**any three**) :　18
   1) Ferranti effect and Tuned power lines
   2) Synchronous phase modifiers
   3) Phase advancers
   4) Belted cables.