



N – 735

Seat No.	
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**T.E. (Electrical) (Sem. – V) (New Course) Examination, 2010**  
**POWER SYSTEM ANALYSIS**

Day and Date: Tuesday, 11-5-2010

Total Marks: 100

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

- Instructions:* 1) Attempt **any three** questions from **each** Section.  
2) Figures to the **right** indicate **full** marks.  
3) Make **suitable** assumptions **whenever** necessary.

**SECTION – I**

1. A) Derive an expression of inductance for single phase two-wire line. 8
- B) The incoming circuit of a single phase transmission line as shown in fig. 1 (b) consists of three wires of 0.3 cm radius. The outgoing circuit consists of two wires of 0.4 cm radius. Calculate the inductance of the complete line. 8

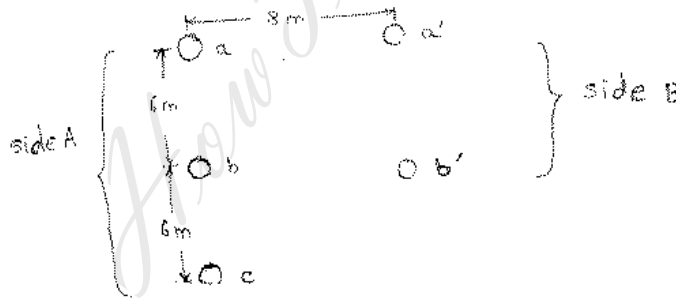


fig. 1 (b)

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2. A) A single phase a.c distributor AB 300 m long is fed from end A and is loaded as 100 A at 0.707 p.f lagging 200 m from point A and 200 A at 0.8 p.f. lagging 300 m from point A.
- The load resistance and reactance of the distributor is  $0.2\Omega$  and  $0.1\Omega$  per km. Calculate the total vtg. drop in the distributor. The load power factors refer to the voltage at the far end. 8
- B) What is circuit breaker ? Describe its operating principle. 8
3. A) Derive an expression of sag of the transmission line. 8
- B) What is string efficiency of suspension type insulator ? Deduce an expression for the potential distribution over a string of suspension insulator. 8
4. Write a short notes (any three) : 18
- a) Skin and proximity effect.
  - b) Pin type insulator.
  - c) Single line diagram of power system.
  - d) Conductor materials.

SECTION – II

5. A) Determine regulation and transmission efficiency for medium line using nominal – T method with suitable vector diagram. 8
- B) A 132 kV, 50 Hz, 3  $\phi$  phase transmission line delivers a load of 50 MW at 0.8 p.f lagging at the receiving end. The generalised constants of line
- $A = D = 0.95 \angle 1.4^\circ$
- $B = 96 \angle 78^\circ$
- $C = 0.0015 \angle 90^\circ$ .
- Find the regulation of the line and charging current, use nominal  $\pi$  method. 8

6. A) From system shown in fig. 6 (a). Construct the  $Y_{BUS}$ . The parameters for various bus are given in table, table 6 (a). 9

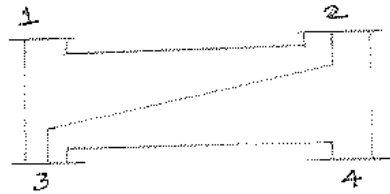


fig. 6 (a)

Line Bus to bus	R, pu	X, pu
1 – 2	0.05	0.15
1 – 3	0.10	0.30
2 – 3	0.15	0.45
2 – 4	0.10	0.30
3 – 4	0.05	0.15

Table 6 (a)

- B) Derive the equation for static load flow using Gauss-Seidal method. 9
7. A) Explain different methods of laying of cables. 8
- B) Write a brief note on oil-filled cables. 8
8. A) Derive the expression of complex power through transmission line. 8
- B) Discuss any two methods for improvement of power factor. 8