Q.P. Code : **3487**

(3 Hours) [Total Marks : 80

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** questions from remaining question.
(3) **Assume** suitable **data** if **required**.

1. (a) Explain proximity effect. 20
   (b) What is per unit system. State its advantages.
   (c) Draw typical AC supply system.
   (d) Explain step potential and touch potential.

2. (a) Derive expression for inductance of double circuit 3 ϕ line with conductors 10
   placed at vertices of equilateral hexagon with side 'D' as shown in fig. Assume
   radius of conductor 'r' m.
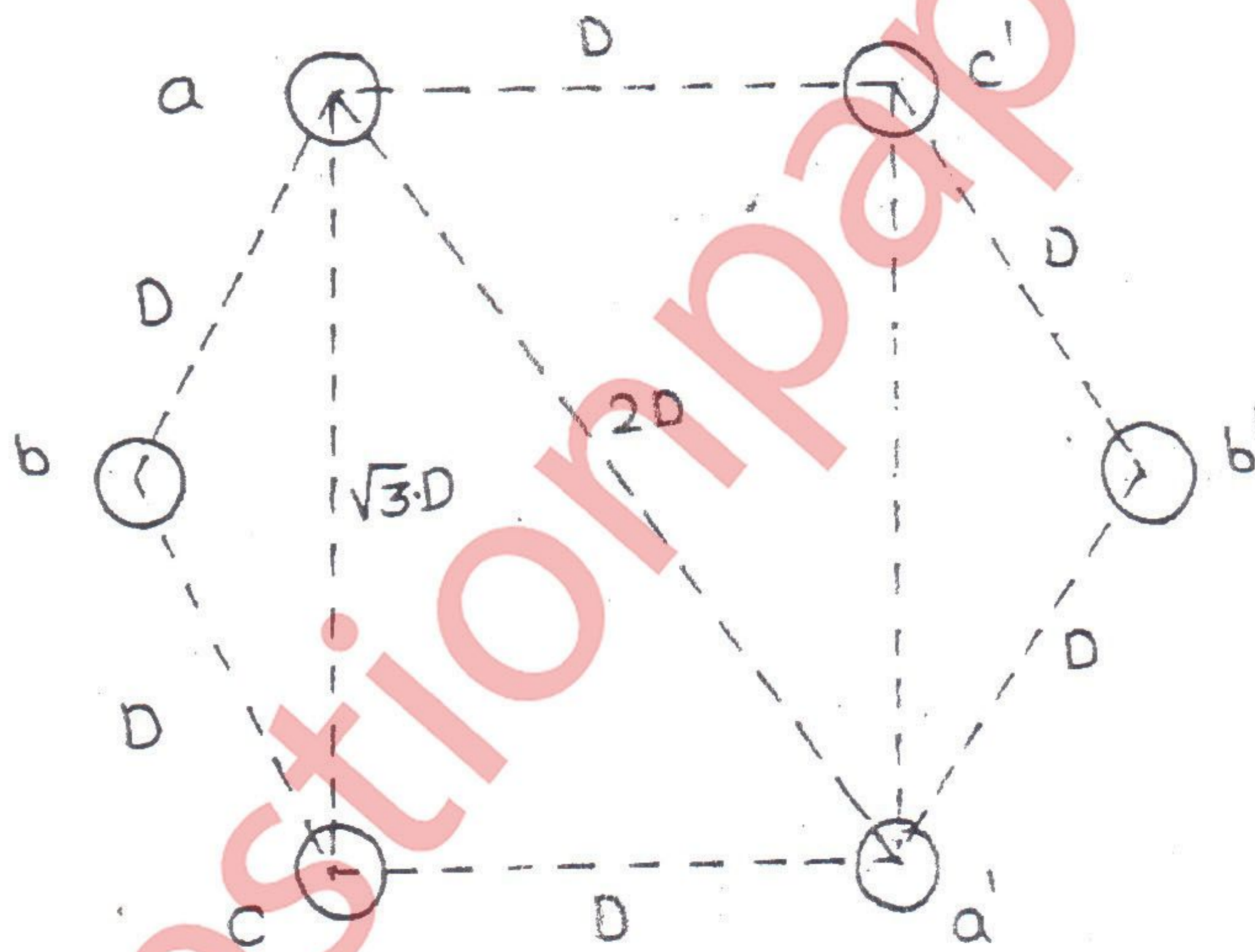
   (b) Explain effect of ground on line capacitance. Also explain method of images. 10

3. (a) Derive expression for ABCD parameters of medium line represented by 10
   nominal - T model. Draw phasor diagram.
   (b) A 3ϕ, 50 Hz, 100km long overhead line has following constants. 10
   Resistance per phase per km = 0.153 Ω
   inductance per phase per km = 1.21 mH
   capacitance per phase per km = 0.00958 μF
   The line supplies a load of 25 MVA at 0.8 pf (lag) at a line voltage of 110 kV
   at receiving end. Using nominal π representation calculate sending end voltage,
   sending end current and sending end power factor.

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4. (a) An insulator string for 66 kV line has 4 discs. The shunt capacitance between 10
    each joint and metal work is 10% of the capacitance of each disc. Find voltage
    distribution accross string and string eficiency.

   (b) The arrangement of conductors of a single phase transmission line is as shown 10
    in fig. wherein the forward circuit is composed of three solid wires 2.5mm in
    radius and return circuit of two wires of radius 5 mm placed symmetrically
    with respect to the forward circuit. Find inductance of each side of the line
    and that of complete line.
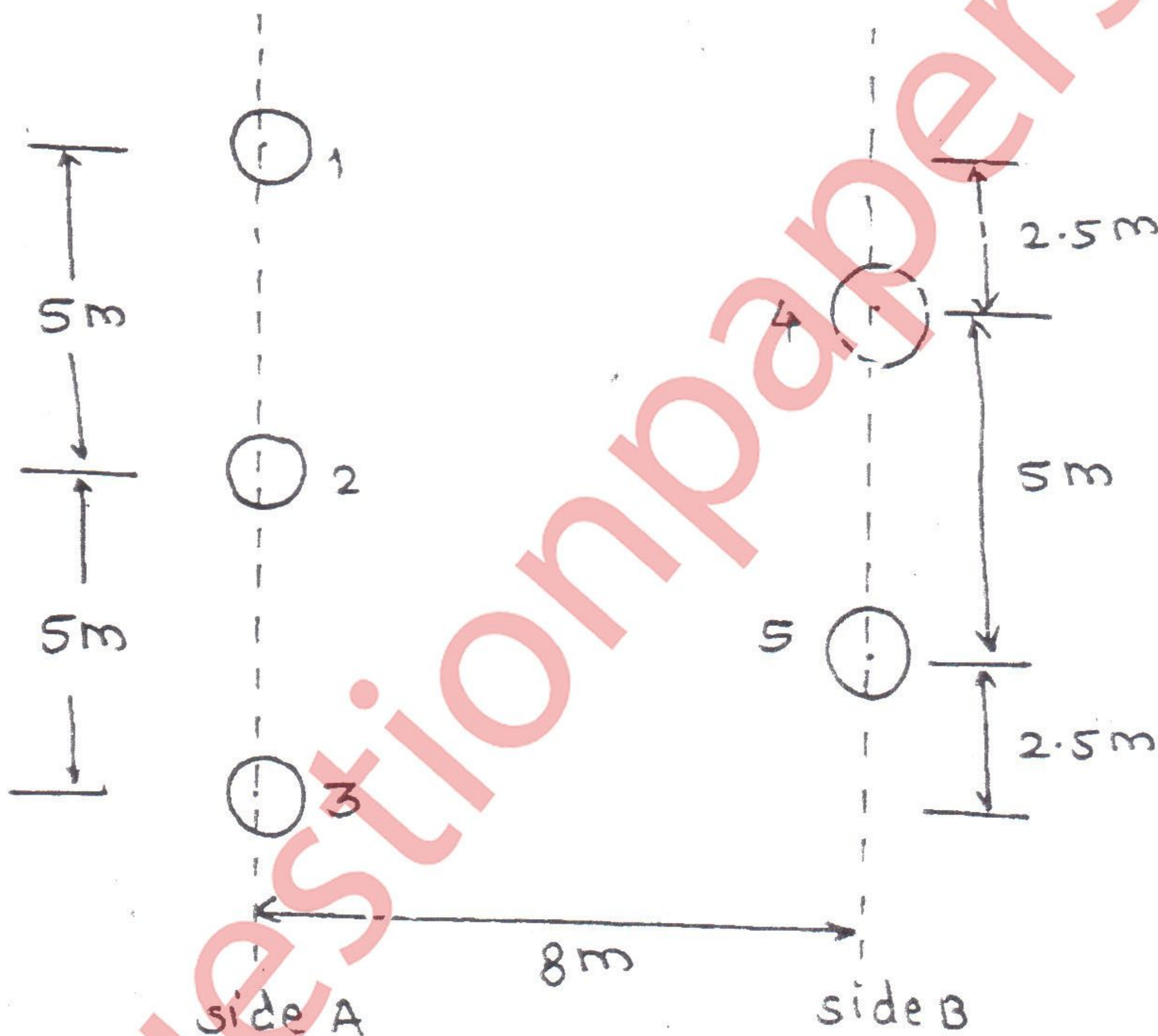
5. (a) Derive expression for capacitance of single core cable. 10
   (b) What is neutral grounding ? Explain any two method of neutral grounding. 10

6. Attempt any two .
   (a) Write short note on Tuned power line. 20
   (b) Explain conductor configuration, spacing, span and clearance.
   (c) Explain general construction of underground cable.