Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech (EE)/SEM-1/MPS-102/2011-12

2011

POWER SYSTEM ANALYSIS-I

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

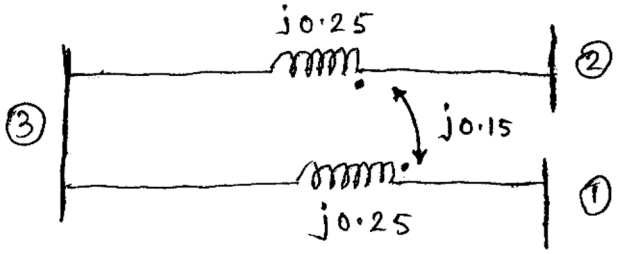
Candidates are required to give their answers in their own words as far as practicable.

Answer any five questions. 5 × 14 =70

1. What is the difference between rotor angle stability and voltage stability ? Derive an expression for critical receiving end voltage and critical power angle at voltage stability limit for a two bus-power system. 5 + 9

2. What is Jacobian Matrix ? What are the differences in Jacobian Matrix used for N-R method and Fast Decoupled method ? Deduce expressions to solve load flow using Gauss-Siedel method by *Y* bus. 3 + 3 + 8

3. Show and explain the modification of Y bus for a regulating transformer in a transmission line. Find Y bus matrix for the given electrical network. 7 + 7



4. Write short notes on the following : 7 + 7

   a) Classification of power system stability

   b) Factors affecting voltage stability and devices for improvement of voltage stability.

5. a) Find and draw the different sequence component for the following open circuit faults when

      (i) R phase open

      (ii) R-Y phase open

      (iii) R-Y-B phase open.

   b) An 11kV, 25 MVA synchronous generator has positive, negative and zero sequence reactance of 0·12, 0·12 and 0·08 pu, respectively. The generator is grounded through a reactance of 0·03 per unit. A single line to ground fault occurs at generator terminals. Determine the fault current. 8 + 6

6. Why do small oscillations appear in power system network ? What are the main governing factors in generating small oscillation. What are the different methods for improving transient stability ? 3 + 4 + 7