SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E - EEE
Title of the paper: Power system Analysis
Semester: V | Max. Marks: 80
Sub.Code: 614504 | Time: 3 Hours
Date: 11-11-2008 | Session: FN

PART – A (10 x 2 = 20)

Answer All the Questions

1. What is the need for system analysis in planning and operation of power system?

2. What are the advantages of per unit system?

3. What is primitive matrix?

4. What is bus admittance matrix?

5. What is the reason for transients during short circuits?

6. Draw the equivalent sequence network for a line-line bolted fault in a power system.

7. What is P-Q bus in power flow analysis?

8. What is the reason for transients during short circuits?

9. Write the swing equation and explain the term involved in it.

10. Give the expression for critical clearing time.

PART – B (5 x 12 = 60)

Answer All the Questions

11. Draw the reactance diagram for the power system shown in fig.11. Neglect resistance and use of 100MVA, 220Kv in 50Ω line. The ratings of the generator, motor and transformer are given below.

Generator	:	40MVA, 25kV, X" = 20%
Synchronous motor	:	50MVA, 11kV, X" = 30%
Y – Y Transformer	:	40MVA, 33/220kV, X = 15%
Y - Δ Transformer	:	30MVA, 11/220kV, (Δ/Y), X=15%

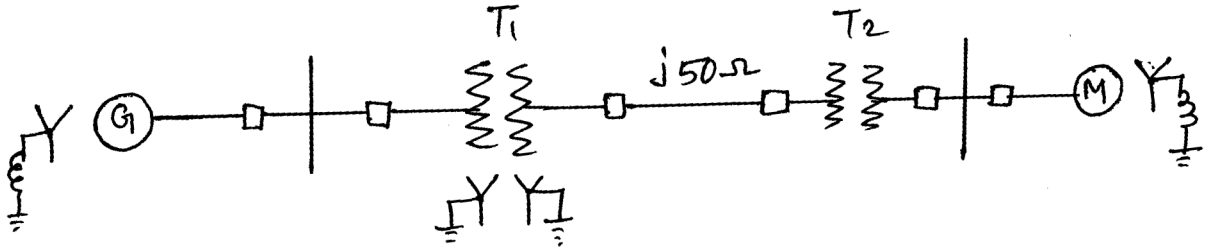
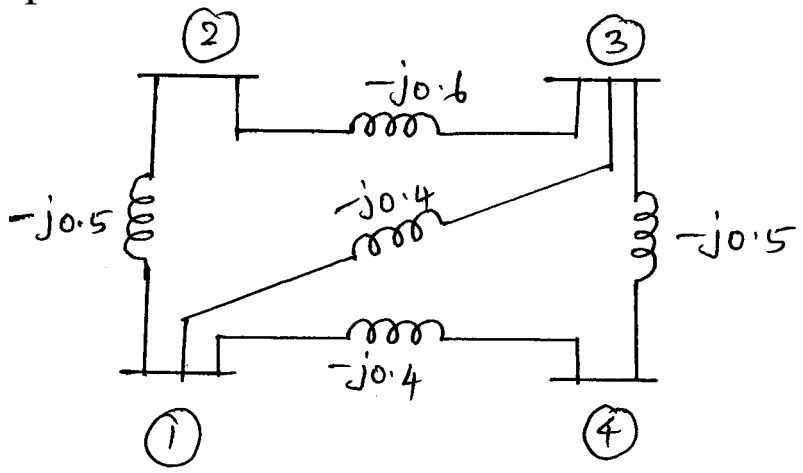


Fig. 11(a)

(or)

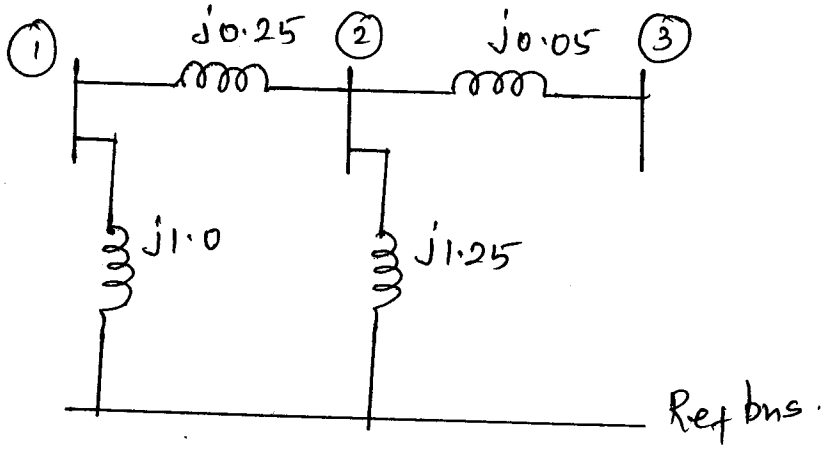
12. Draw the structure of an electrical power system and describe the components of the system with typical values.

13. Find bus admittance matrix for the given network. Determine the reduced admittance matrix by eliminating node 4. The values are marked in p.u.



(or)

14. Find the bus impedance matrix for the reactance diagram is shown in fig. all the impedances are marked in p.u.



15. A generator is connected through a transformer to a synchronous motor. The subtransient reactance's of generator and motor are 0.15 p.u and 0.35 p.u respectively. The leakage reactance of the transformer is 0.1 p.u. All the reactances are calculated on a common base. A three phase fault occurs at the terminals of the motor when the terminal voltage of the generator is 0.9 p.u. The output current of generator is 1 p.u. and 0.8 p.f leading. Find the subtransient current in p.u. in the fault, generator and motor. Use the terminal voltage of generator as reference vector.

(or)

16. Derive the expression for fault current in Line-to-line fault on an unloaded generator in terms of symmetrical components.

17. Derive load flow algorithm using Gauss-Seidel method with flow chart and discuss the advantages of the method.

(or)

18. Derive load flow algorithm using Newton-Raphson method with flow chart and state the importance of the method.

19. Derive Swing equation used for stability studies in power system.

(or)

20. Explain the modified Euler method of analyzing multimachine power system for stability, with neat flow chart.