# SATHYABAMA UNIVERSITY

Course & Branch :B.E - EEE
Title of the Paper :Power system Analysis          Max. Marks :80
Sub. Code :414504/514504                          Time : 3 Hours
Date :30/04/2010                                  Session :AN

PART - A                    (10 x 2 = 20)
Answer ALL the Questions

1.  Write equation for converting the p.u impedance expressed in one base to other base.

2.  Define steady state stability limit.

3.  Explain bus classification in power flow analysis with their known and known quantities.

4.  What is the need for acceleration factor?

5.  Write equations to determine sequence components for unbalanced system of currents.

6.  Draw the equivalent sequence network diagram for a single phase to ground fault in a power system.

7.  Write the swing – equation and explain the term involved in it.

8.  State equal area criterion.

9.  Define load factor and plant capacity factor.

10. Draw the incremental fuel rate curve for thermal power stations and how to draw the incremental fuel cost from it.

PART – B                    (5 x 12 = 60)
Answer All the Questions

11. (a) List out the advantages of per unit computations. (2)

(b) The reactance of a generator is designated X" is given as 0.2 per unit based on the generator's name plate rating of 20 KV, 500 MVA. Find X" on the new base of 22 KV, 100 MVA. (4)

(c) A single – phase transformer is rated 110/440 V, 2.5 KVA. Leakage reactance measured from the low-voltage side is $0.06\Omega$. Determine leakage reactance in per unit.

(or)

12. Draw the reactance diagram using a base of 100 MVa, 220 KVin 50 ohm line.
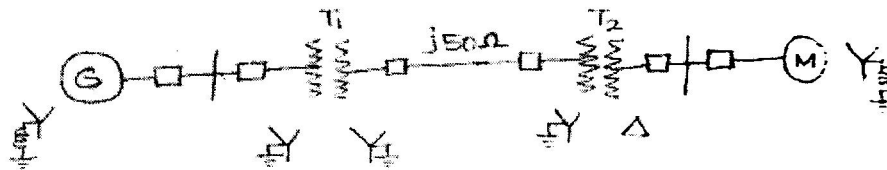


Generator: 40 MVA, 25 KV, X" = 20%
Motor     : 50 MVA, 11 KV, X" = 20%
Star – Star transformer: 40 MVA, 33/220 KV, X = 15%
Star – Delta transformer: 30 MVa, 11/220 KV, X = 15%

13. Derive load flow algorithm using Gauss – Seidal method with flow chart.

(or)

14. Explain the step by step computational procedure for the Newton – Raphson method of load flow studies.

15. Develop the sequence network for a double line to ground (LLG) fault.

(or)

16. A 15 MVa, 6.9KV, generator unloaded star connected, has +ve, -ve zero-sequence reactance of 25%, 25% and 8% respectively. A reactor with 6% reactance based on the rating of the generator is placed in line from neutral to ground. A line to line fault occurs at

terminals of the generator when it is operating at rated voltage and disconnected from the system. Find the initial symmetrical rms line and ground wire currents and line to neutral voltages, if the fault does not involve ground.

17. Derive Expression for critical clearing angle.

<div align="center">(or)</div>

18. Write the computation algorithm for obtaining swing curves using modified Euler's method.

19. Describe the computer approach to economic load dispatch with flow chart.

<div align="center">(or)</div>

20. The fuel cost characteristics of two generators are obtained as under. $F_1 = 1000 + 50P_1 + 0.01 P_1^2$ Rs/hr.
    $F_2 = 2500 + 45P_2 + 0.005 P_2^2$ Rs/hr.
    If the total load to be supplied is 1000 MW, find optimal load division between two generators.