Code No: NR410203 **NR**

IV B.Tech I Semester Supplementary Examinations, April/May 2005
COMPUTER METHODS IN POWER SYSTEMS
(Electrical & Electronic Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Write short notes on the following:
   (a) Data for power flow studies.
   (b) Merits and demerits of using polar and rectangular coordinates in load flow studies.
   (c) Choice of Acceleration factors.
2. Find δ_2 and Q_2 for the system shown in figure1 use. N.R. method upto one iteration.

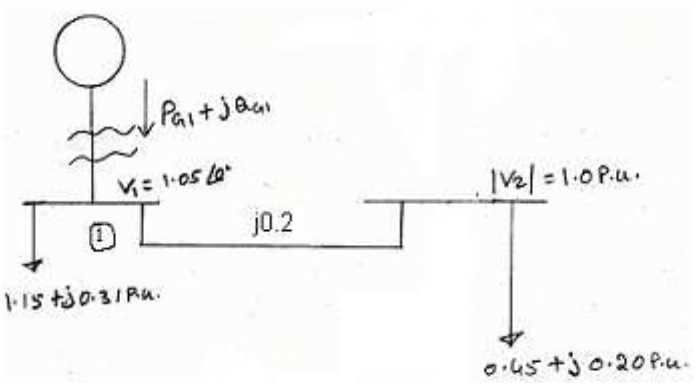

Figure 1:

3. Develop the power flow model using Decoupled method and explain the assumptions made to arrive at the Fast Decoupled load flow method. Draw the flow chart and explain.
4. A 25 MVA 13.8 KV generater with Xd"=15% is connected through a transformer to a bus which supplies four identical motors as shown in figure2. the subtransient reactance of each motor is 20% on its base of 5 MVA 6.9 KV. The three phase rating of transformer is 25MVA 13.8/6.9 KV with a leakage reactance of 10%. The bus voltage of the motors is 6.9 KV When a three phase fault occurs at point P. for the fault specified determine
   (a) subtransient current in the fault
   (b) the subtransient current in the breaker A

(c) symmetrical short circuit interrupting current in the fault and in breaker A. given transient reactance of each motor is 30% on its rating.

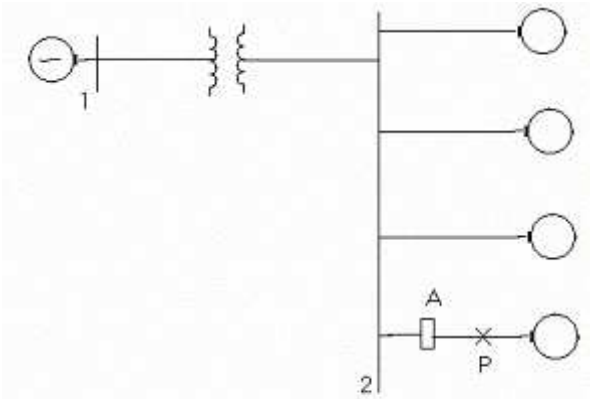

Figure 2:

5. Derive the algorithm for symmetrical short circuit analysis of a multi machine power system using Z Bus matrix. Give steps for implementing this algorithm.

6. (a) Define the following terms :
   i. Steady state stability limit.
   ii. Dynamic state stability limit.
   iii. Transient state stability limit .
   (b) List the assumptions made in the transient stability solution techniques.
   (c) Derive the expression for steady state stability limit using ABCD parameters.

7. (a) What are the methods of improving transient stability.
   (b) A generator is delivering 1.0 p.u. power to infinite bus system through a purely reactive network. A fault occurs on the system and reduces the output to zero. The maximum power that could be delivered is 2.5 p.u.. When the fault is cleared, original network conditions exist again. Compute critical clearing angle.

8. (a) What are the steps to between followed for determining multi machine stability?
   (b) Write the state variable formulation of swing equations.

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