Code: R7410203

R7

IV B.Tech I Semester (R07) Supplementary Examinations, May 2012
POWER SYSTEM ANLYSIS
(Electrical & Electronics Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1.   Explain the procedure to form Y_{BUS} by direct inspection method with suitable example

2.   (a)   Describe the procedure for modifications of Z_{BUS} when a line with mutual impedance is added or removed.
     (b)   Find the z_{11} of the circuit given by determining the impedance measured between Bus 1 and the reference mode when currents injected at bused 2, 3 and 4 are zero.
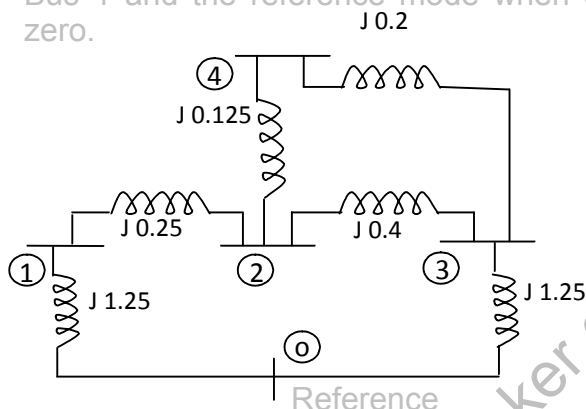
3.   (a)   Explain the flow chart for Gauss - Seidel iterative method for load flow solution using Y_{BUS}.
     (b)   For the sample system shown the generators are connected at all the four buses, while loads are at buses 2 and 3 Values of real and reactive power are listed with table. All buses other than slack bus are PQ type. Assume a flat voltage start, find the voltages and bus angles at the three buses at the end of the first Gauss-seidel iteration.
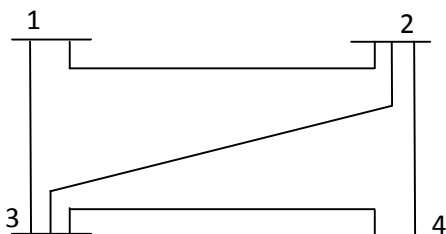
Bus	Pi, P.U	Qi, P.U	Vi, P.U	Remarks
1	-	-	$1.04 \angle 0^0$	Slack bus
2	0.5	- 0.2	-	PQ bus
3	- 1.0	0.5	-	PQ bus
4	0.3	- 0.1	-	PQ bus

4.   Explain the sequence of steps for the solution of load flow problem using Newton-Raphson method and write its advantages.

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5. (a) Explain the importance of per unit system.
   (b) What do you understand by short circuit KVA? Explain.
   (c) A 3-phase, 25 MVA, 11 KV alternator has internal reactance of 6%. Find the external reactance per phase to be connected in series with the alternator so that steady state short circuit current does not exceed 6 times the full load current.

6. (a) Derive an expression for the fault current for a single line to ground fault as on unloaded generator and draw the inter connection of sequence networks for L-G fault.
   (b) A 25 MVA, 13.2 KV alternator with solidly grounded neutral has a subtransient reactance of 0.25 pu. The negative and zero sequence reactances are 0.35 and 0.1 pu respectively. A single line to ground fault occurs at the terminals of an unloaded alternator. Determine the fault current and the line-to-line voltages Neglect resistance.

7. (a) Explain various methods to improve the steady state stability.
   (b) Station A transmits 50 MW of power to station B through a tie line. The maximum steady state capacity of line is 100 MW. Determine the allowable sudden load that can be switched on without loss of stability.

8. (a) What is equal area criterion? Discuss its applications and limitation in the study of power system stability.
   (b) Derive swing equation and discuss its applications in the study of power system stability.