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Reg. No. : .....

Name : .....

First Semester M.Tech. Examination, March 2013
(2008 Scheme)
Branch : Electrical and Electronics Engineering
Stream : Power Control and Drives
EDC 1005 : ADVANCED POWER SYSTEM ANALYSIS

Time : 3 Hours Max. Marks : 100

Instruction : *Answer* ***any five*** *questions.*

1. a) What are the assumptions made in decoupled and fast decoupled load flow solution methods ? 5

b) The line data and bus data of a 3-bus system are given below. Update the bus voltages and phase angles at the end of the first iteration by Fast Decoupled Method. Assume a flat start. Limits on Q_2 is $0 \leq Q_2 \leq 0.8$. All numerical values are given in p.u.

Line Data

Bus	Impedance
1-2	0.025+j0.1
1-3	0.025+j0.1
2-3	0.025+j0.1

Bus Data

Bus	P_{Gi}	Q_{Gi}	P_{Di}	Q_{Di}	V	δi(rad)	Bus Type
1	–	–	0.9	0.4	1.02	0	Slack
2	1.4	–	0	0	1.03	–	PV bus
3	0	0	1.1	0.4	–	–	PQ bus

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2. What is AC-DC load flow ? Explain the various steps involved in the solution algorithm. 20

P.T.O.

3. a) Formulate the mathematical model for optimal power flow problem. 8

   b) Explain the gradient method for solving the OPF problem with both inequality and equality constraints. 12

4. On a three-bus system, generators G1 (100 MVA) and G2 (200 MVA) are feeding power into buses 1 and 2 respectively via step-up transformers. The impedances of L_{12}, L_{23}, L_{13} are assumed as j0.2 p.u. on 100 MVA base. Find SCC at all three buses. Find bus voltages and short-circuit currents on the three lines following a solid symmetrical short at bus 2. All the three prefault bus voltages are assumed to have 1 p.u. magnitude. Take generator plus transformer reactance as 0.3 p.u based on respective generator rating. Assume base MVA as 50 MVA. 20

5. Explain the computational procedures involved in the formulation and implementation of least square method for the state estimation of electric power systems. 20

6. Explain the symmetrical and unsymmetrical fault analysis of large interconnected power systems using bus impedance matrix 20