Roll No. Total No. of Pages : 02

Total No. of Questions : 08

M.Tech. (Power System) (Sem.–1)

ADVANCED POWER SYSTEM ANALYSIS

Subject Code : PEE-502

M.Code : 38807

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. A power system consists of 4 buses. Generators are connected at buses 1 and 3, reactances of which are j0.25 and j0.15 respectively. The transmission lines are connected between buses 1-2, 1-4, 2-3 and 3-4 and have reactances j0.25, j0.3, j0.4 and j 0.2 respectively.

   a) Form A,A,B,B,K,C,C matrices.

   b) Find Y_{BUS} Using singular transformation matrix

2. For the network given below Form Z_{Bus} taking Bus 2 as reference bus.

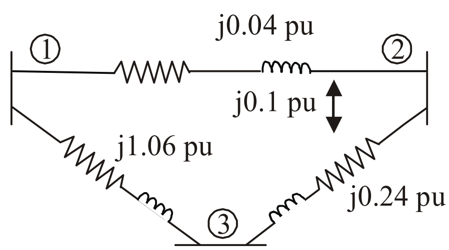

Fig.1

3. Explain three phase Z_{BUS} Algorithm when a branch is added to given network.

4. Explain contingency analysis of power system by Brown's method.

5. Write an algorithm for Fast decoupled load flow. Write assumptions also.

6. For the system shown below calculate the following for line to ground fault at bus 5 with $Z_f = 0$:

   a) The total fault current

   b) Bus voltage during fault

   c) Short circuit current in the lines .

   d) Fault level at bus 5

The + seq., - seq. and zero seq. bus impedance for the system is given below :

$Z_{BUS}^{(1)} = Z_{BUS}^{(2)} =$

0.1821	0.1687	0.1571	0.1341
0.1687	0.1952	0.2750	0.2346
0.1571	0.2750	0.4570	0.3211
0.1341	0.2346	0.3211	0.4942

$Z_{BUS}^{(0)} =$

0.0492	0.04845	0.04791	0.03872
0.04845	0.0969	0.09582	0.07745
0.04791	0.015	0.15297	0.1044
0.03872	0.07745	0.1044	0.5637

7. For A three bus power system, system parameters and the load and generation data is given below. The voltage at bus 2 is maintained at 1.01p.u. The maximum and minimum reactive power limits of the generation at bus 2 are 30 and 0 Mvar respectively. Taking bus 1 as slack bus and voltage is 1.03 + j0.0 obtain the load flow solution using Gauss - Seidel iterative method. P_{g2} = 50MW, P_{d2} = 300MW. P_{d3} = 140MW, Q_{d3} = 40MVar. Perform Two iterations

Bus code	Impedance
1-2	j0.04
1-3	j0.03
2-3	j0.025

8. Discuss line power flow state Estimation.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.