

**Government College of Engineering, Aurangabad**  
(An Autonomous Institute of Government of Maharashtra)

**M.E. (EPS) Examination**  
End Semester Examination

**EE503 : Computer Aided Power System Analysis**

Time: Three Hours

Date: **21 DEC 2016**

Max.Marks:60

“Verify the course code and check whether you have got the correct question paper”

**N.B:-**

1. Attempt any four questions
2. Figures to the right indicate full marks
3. Assume suitable data if necessary
4. Use of non-programmable calculator is allowed

**Q1. a)** The bus impedance matrix of the network is as below. Determine the new bus impedance matrix when a line of impedance  $Z_{13}=j0.8$  is removed by opening circuit breakers at both ends of the network shown in fig. 1 **(9M)**

$$Z_{bus} = \begin{array}{|c|c|c|} \hline \mathbf{j0.16} & \mathbf{j0.08} & \mathbf{j0.12} \\ \hline \mathbf{j0.08} & \mathbf{j0.08} & \mathbf{j0.16} \\ \hline \mathbf{j0.12} & \mathbf{j0.16} & \mathbf{j0.34} \\ \hline \end{array}$$

**b)** Explain the importance of incidence matrices in power system network solution. **(6M)**

**Q2.** The one line diagram of a simple power system is shown in fig. 2. All impedances are expressed in p.u. on a common MVA. A bolted three phase fault occurs at bus 4. Using Thevinin's theorem obtain the impedance to the point of fault & the fault current in p.u. Also determine the bus voltages & line currents during fault. **(15M)**

**Q3.** Find the power flow solution for the simple three bus power system shown in fig. 3 using Fast decoupled method. Line impedances are marked in per unit on a 100 MVA base & the line charging susceptances are neglected.

**Q4. a)** Explain algorithm for static state estimation of power system. **(8M)**

**b)** Explain network observability & determination of unobservable states. **(7M)**

**Q5. a)** Analyze single line to ground fault & draw sequence network. **(8M)**

**b)** Explain the importance of power flow studies in power system. **(7M)**

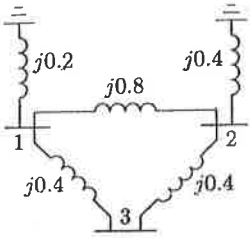


Fig.1

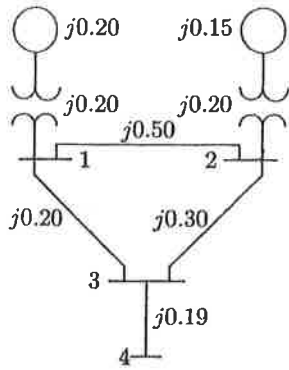


Fig. 2

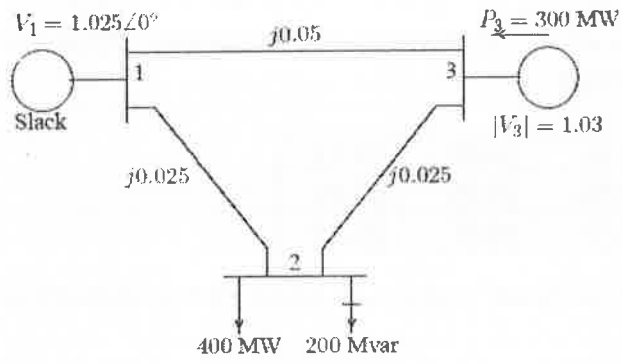


Fig. 3