**Exam. Code: 0936**
**Sub. Code:33767**

**2055**

**B.E. (Electrical and Electronics Engineering)**

**Sixth Semester**

**PC-EE-601: Computer Aided Power System Analysis (CAPSA)**

**Time allowed: 3 Hours** **Max. Marks: 50**

***NOTE:*** ***Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Part.***

*x-x-x*

1. (a) What are factors which affects steady state stability?
   (b) How transformer impedance on primary side is referred on secondary side in per unit.
   (c) Discuss role of secondary loop in LFC.
   (d) What are limitations of equal area criterion in transient stability analysis of multi-machine system?
   (e) What the role of ZBus in fault analysis?

(5*2=10)

PART-A

2. (a) The fuel cost function in Rs/ hr for two 800 MW thermal plants are given by:
   $C1 = 400 + 6\,P1 + 004\,P_1^2$
   $C2 = 500 + \beta\,P2 + \gamma\,P_2^2$
   where P1 and P2 are in MW.
   (i) The increment cost of power λ is Rs 8/Mwh when the total power demand is 600 MW. Neglect losses, find optimal generation of each plant.
   (ii) The increment cost of power λ is Rs 10/Mwh when the total power demand is 1500 MW. Neglect losses, find optimal generation of each plant.
   From the results of (i) and (ii), find fuel coefficients β and γ.
   (b) Discuss equal area criterion curves for sudden increase of power input to a synchronous machine.

(7,3)

3. The three phase power and single line ratings of electric power system as shown in Fig 1. Draw an impedance diagram in per unit on a 100 MVA base. Choose 20 kV as the voltage base for generators.

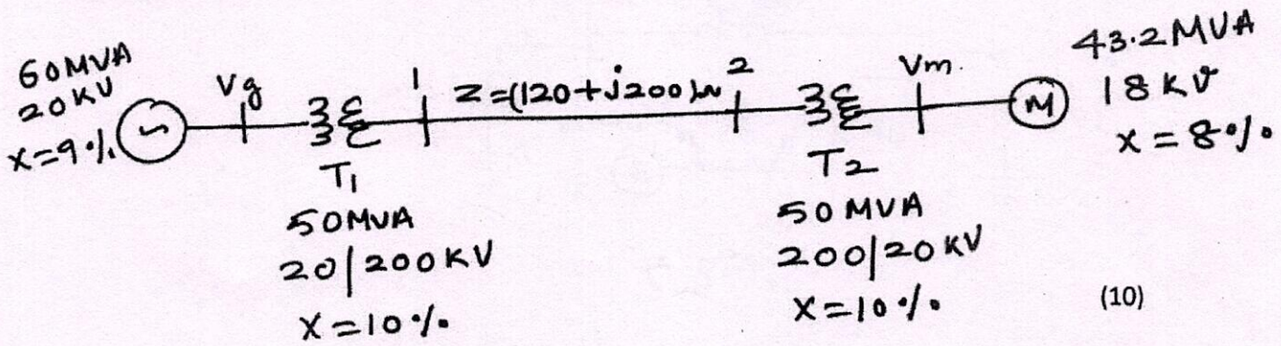


Fig 1

(10)

**<u>P.T.O.</u>**

4. In a power system network as shown in Fig 2, determine $V_2$ using Gauss-Seidel method and perform for two iterations. Also determine $S_1$ and real and reactive power loss in the line.

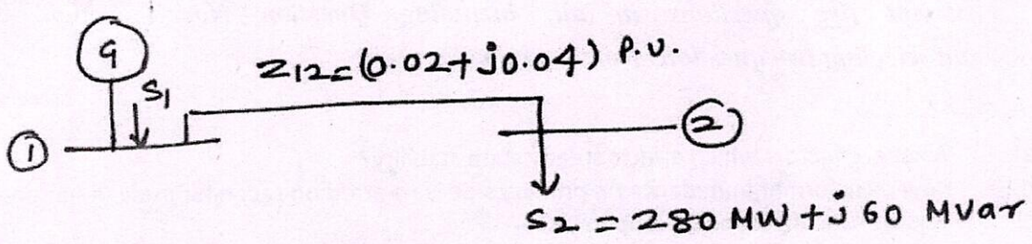


Fig 2 (10)

**PART-B**

5. For a given system as shown in Fig 3, Determine the fault current, bus voltages and line current during the fault when a balanced three phase fault occurs with fault impedance $Z_f$=0.8 per unit occurs on bus 3.

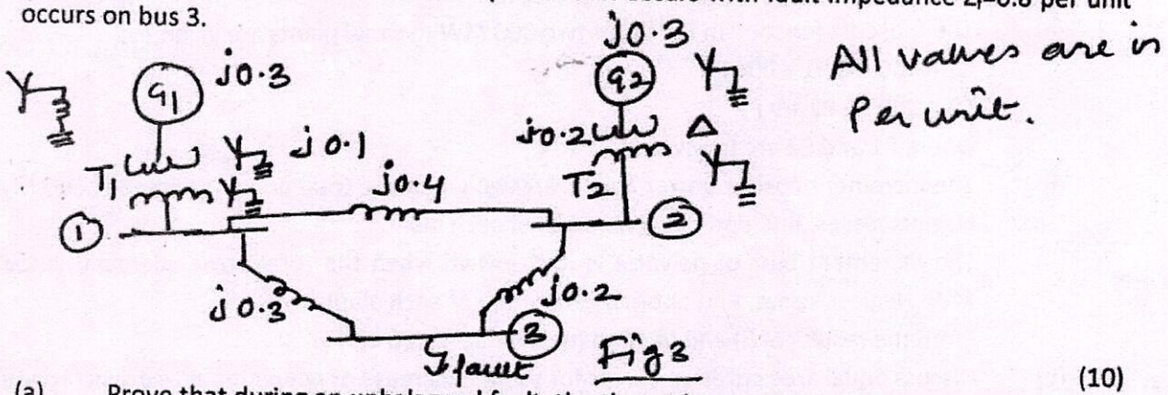


Fig 3 (10)

6. (a) Prove that during an unbalanced fault, the three phase power can be represented in symmetrical power components.

   (b) Derive an expression for sequence network connection for double line-to-ground fault. (5,5)

7. (a) Construct the bus impedance matrix for the network as in Fig 4.

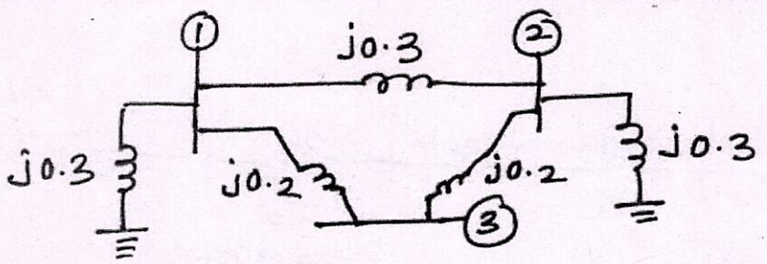


Fig 4

   (b) Discuss zero-sequence impedance of a rotating machinery. (7,3)