Exam.Code:0936
Sub. Code: 6717

2053

B.E. (Electrical and Electronics Engineering)

Sixth Semester

EE-601: Computer Aided Power System Analysis

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

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Assume missing data, if any.*

x-x-x

1. (a) What is the effect of acceleration factor in load flow analysis?
   (b) Discuss the advantages of per unit system.
   (c) Define the short circuit capacity of power system.
   (d) Draw the zero sequence network of the given system

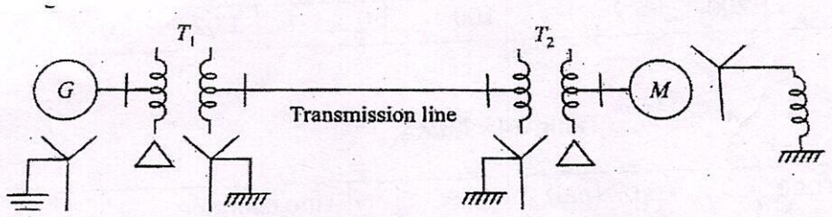


Fig 1

(e) Define critical clearing angle in power system stability.

(5"*2=10)

PART-A

2. (a) Draw the per unit reactance diagram for power system as shown in given Fig. use a base of 50 MVA and 13.8 kV on G1.

G1: 20 MVA, 13.8 kV, X'' = 10%
G2: 20 MVA, 16 kV, X'' = 10%
G3: 30 MVA, 13.8 kV, X'' = 10%
T1: 25 MVA,220/13.8 kV, X= 15%
T2: 3 single phase unit each rated 10 MVA, 127/16 kV, X=8%
T3: 35 MVA, 220/22kV, X= 10%

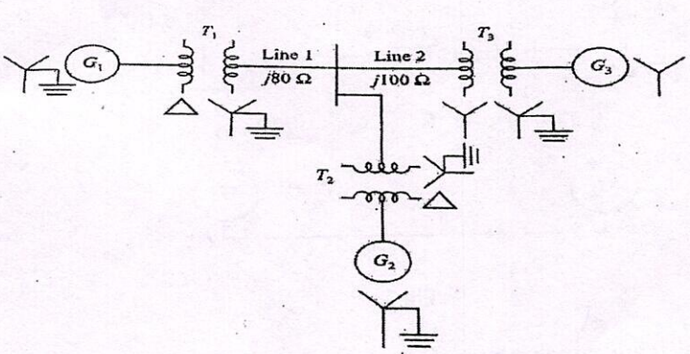


Fig 2

(b) Derive an expression for Power angle equation for 2-bus system.

(7,3)

3 (a) A 50 Hz synchronous generator is capable of supplying 400 MW of power. It is connected to a large power system and delivering 80 MW when a 3-phase occurs at the terminals, determine the time in which fault must be cleared if the maximum power angle is to be 85^0, assume H=7MJ/MVA on a 100 MVA base. Also find clearing angle.

(b) Discuss speed-governor characteristics of a generating unit. How is frequency maintained for these characteristics for under and overload conditions.

(5,5)

P.T.O.

4 (a) What is AGC? How it plays a role in power system operation?

(b) Find the bus voltages at node 2 and 3 using Gauss-Seidel algorithm after first iteration. Also find line flows for the given data. All given values of impedances are on 100 MVA.

Table1-Busdata

Bus No	PG (MW)	QG (MVAR)	PD (MW)	QD (MVAR)	V (p.u)	δ(degree)
1	-	-	-	-	1.04	0
2	-	-	200	30	-	-
3	200	-	100	0	1.02	0

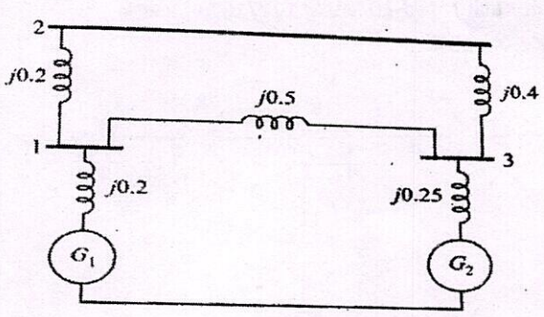
Table 2-Linedata

Bus-code	Z (p.u)	Line charging admittance /2
1-2	0.06+j 0.12	j0.05
1-3	0.04+j0.04	J0.02
2-3	0.02+j0.12	J0.01

(3,7)

PART-B

5 Formulate Z bus using step by step algorithm for the given Fig

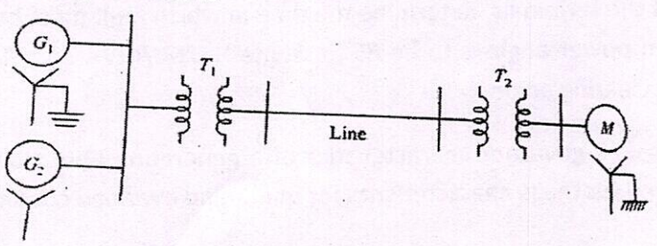


(10)

Fig 3

6. Two alternators in parallel and supplying synchronous motor which is receiving 60 MW power at 0.8 pf lagging at 6.0 kV. Compute the fault current when a single line to ground fault occurs at the middle of the line through a resistance of 4.033 Ω . Data is as:

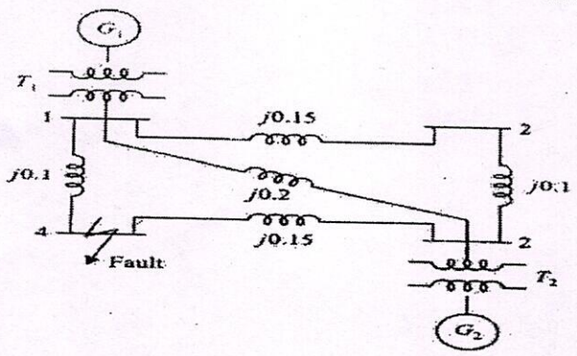
G1 and G2: 11 kV, 100 MVA, $X^+ = 0.2$ pu, $X^- = X^0 = 0.1$ pu
T1: 180 MVA, 11.5/115 kV, X=0.1 p.u
T2: 170 MVA, 6.6/11.5 kV, X=0.1 p.u
M: 6.3 kV, 160 MVA, $X^+ = X^- = 0.3$ p.u , $X^0 = 0.1$ pu
Line: $X^+ = X^- = 30.25\Omega$, $X^0 = 60.5\ \Omega$



(10)

Fig 4

7. Perform short circuit analysis for a three phase solid fault on bus 4.
G1: 100 MVA, 11.2 kV, X" = 8% ; G2: 100 MVA, 11.2 kV, X" = 8% ;
T1: 11/110 kV, 100 MVA, X= 6% ; T2: 11/110 kV, 100 MVA, X= 6%. All values in per unit.



(10)

Fig 5

X-X-X