

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER M.TECH. DEGREE EXAMINATION

C

POWER SYSTEMS

(Electrical and Electronics Engineering)

04 EE 6403 COMPUTER APPLICATIONS IN POWER SYSTEMS

Duration: 3Hrs

PART A

Max.Marks: 60

Answer All Questions .

Each Question carry 3 Marks

1. Discuss Kirchoffs current law and fundamental cutset matrix
2. Discuss decoupled load flow
3. Discuss the representation of three phase power network
4. Find admittance matrix

Bus data

Bus no	P_G	Q_G	P_L	Q_L	V_{SP}
1(slack)					1.0
2(PV)	5.3217				1.1
3(PQ)			3.6392	0.5339	

Line data

SB	EB	R(pu)	X(pu)
1	2	0	0.1
1	3	0	0.2
2	3	0	0.2

5. What is meant by symmetrical components.
6. Build Z bus for three phase to ground fault using necessary derivations.
7. What is meant by unsymmetrical fault?
8. Explain line to line fault.

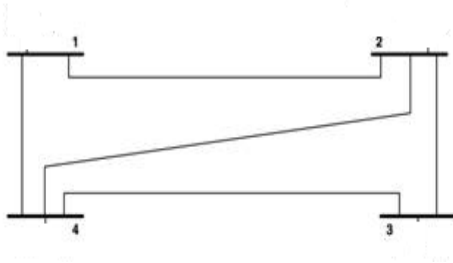
PART B

(Each Question carries 6 Marks)

9. Explain building algorithm for bus impedance matrix for addition of a link.

OR

10. Discuss the development of loop admittance and loop impedance matrices from graph theoretic approach.
11. Obtain the load flow solution at the end of first iteration of the power system shown in figure .
The data is given in table . The solution is to be obtained for the following case
a) All buses except one are PV buses.
b) Bus 2 is a PV bus where voltage magnitude is specified as 1.04

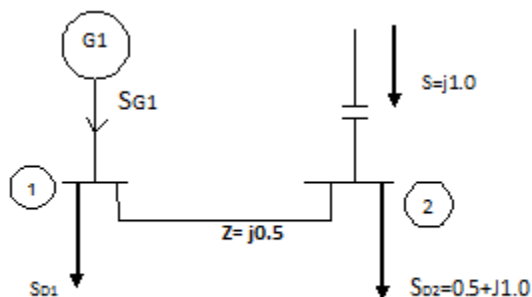


SB	EB	R(pu)	X(pu)
1	2	0.05	0.15
1	3	0.1	0.30
2	3	0.15	0.45
2	4	0.10	0.3
3	4	0.05	0.15

Bus No	P_i (pu)	Q_i (pu)	V_i
1			1.04∠0
2	0.5	-0.2	
3	-1.0	0.5	
4	-0.3	-0.1	

OR

12. Obtain the voltage at bus 2 for the power system shown in figure using Gauss Seidel method, if $V_1=1+j0.0$ (3 iterations)



13. Explain triangular factorization method.

OR

14. Explain the representation of synchronous machine and three phase power network.

15. Explain the advantages of incorporating FACTS devices in power system with example.

OR

16. Write the algorithm for calculating system conditions after 3 phase short circuit.

17. A 20MVA ,13.8 kV generator has a direct axis subtransient reactance of 0.25pu. Its negative sequence reactance is 0.35pu and zero sequence reactance is 0.1pu. The neutral of the generator is grounded. Find the fault current , line to ground voltage .

OR

18. Explain the procedure for the calculation of symmetrical fault. A 3-phase 10 MVA ,11KV alternator has 10% sub-transient reactance. Find the short circuit MVA and current , if a symmetrical fault occurs at its terminals.

19. A synchronous generator rated 3-phase 11KV , 100 MVA has $X_1 = X_2 = j0.1$ p.u and $X_0 = j0.04$ p.u. determine the fault current and line to line voltage during the fault condition:

a)if a single line to ground fault occurs through generator terminals b)if generator neutral is solidly grounded c)if the generator is operating at no load and rated voltage prior to the fault

OR

20. In a network the magnitude of fault current for an L-G fault is 0.75pu and for an LL fault is 8.66 pu. If the prefault voltage at the fault location is 1.0 pu , determine the equivalent zero sequence impedance of the network