B.E. Eighth Semester (Electrical Engineering (Electronics & Power)) (C.B.S.)

Computer Applications in Power System

P. Pages : 3 **NKT/KS/17/7580**

Time : Three Hours * 0 5 2 7 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Assume suitable data whenever necessary.
7. Use of non programmable calculator is permitted.

1. a) To prove $Y_{BUS} = A^T.[Y].A$ by singular transformation. **8**

b) For fig. 1 b shown, determine matrices $A, \hat{B}, \hat{C}$ & K. Select node 1 as reference and elements 2 & 5 as links prove $A.K^T = B$ for given network. **12**

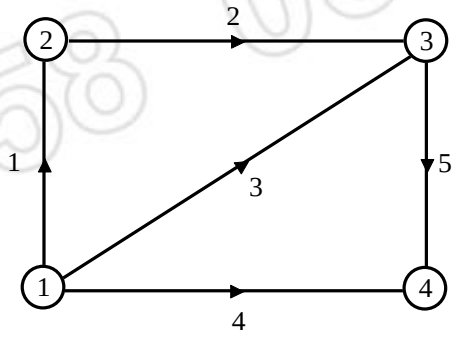

Fig. 1 b

OR

2. For the system shown in fig. 2. Obtain Y_{BUS} & Y_{Loop} by singular transformation. Also obtain Y_{Br} from Y_{Bus}. Positive sequence reactance of different elements are shown in fig. 2 in brackets. **20**

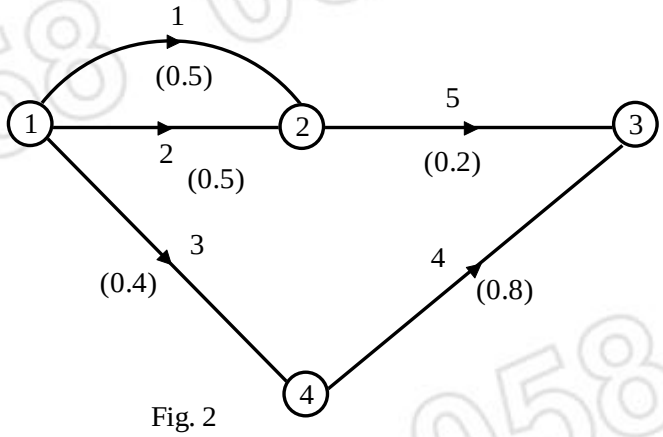

Fig. 2

3. a) The power system represented by single line diagram is shown below obtain.

i) Y_{Bus} by direct inspection **3**

ii) Y_{Bus} by algorithm **7**

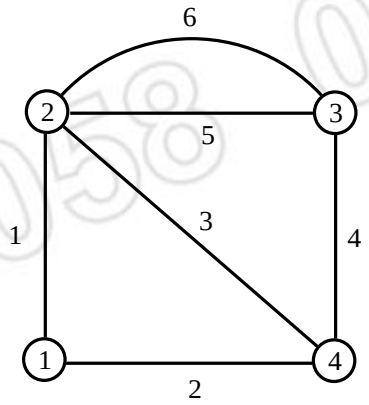

Fig. 3(a)

Positive sequence reactances of the elements are given in table.

Element No.	1	2	3	4	5	6
Reactance	0.4	0.3	0.3	0.4	0.5	0.2

b) Derive the equations for the addition of branch to partial network. **10**

OR

4. a) Form Bus impedance matrix using algorithm or the power system shown in fig. 4 a. Select Bus 1 as Ref. **12**

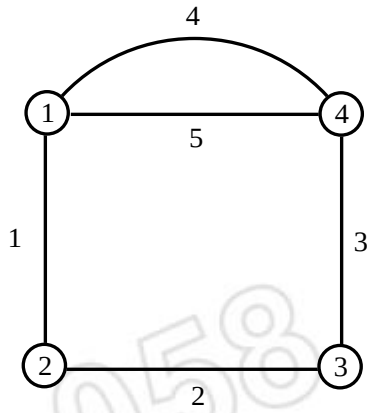

Fig. 4(a)

Reactance of the elements are shown in table.

Element No.	1	2	3	4	5
Reactance	0.13	0.1	0.12	0.15	0.14

b) Modify Z_{Bus} if the element connected between Bus 2 & Bus 3 is removed. (Refer Fig. 4 a) **4**

c) Modify Z_{Bus} if the impedance of the element connected between Bus 2 & Bus 3 is required reduce to 50% of the original value. (Refer Fig. 4 a). **4**

5. a) How three phase network component is represented in impedance and admittance form? Write down performance equation in both forms. **10**

b) Show that the impedance matrix for three phase balanced rotating element can be diagonalised using transformation matrix 'T_S'. **10**

OR

6. For the power system shown in fig. 6. If L - G fault takes place at Bus. 3.
Determine :
a) Total fault current **16**
b) Bus voltages during fault **4**
Assume prefault bus voltages of 1 pu.

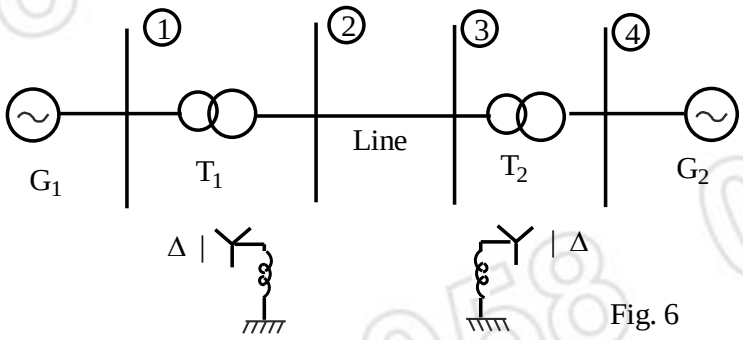

Fig. 6

sequence reactance data is given below :

$G_1 \& G_2 : X_0 = 0.08;\ X_1 = X_2 = 0.2;\ X_g = 0.03$

$T_1 \& T_2 : X_0 = X_1 = X_2 = 0.1;\ X_g = 0.03$

Line : $X_0 = 0.7$ & $X_1 = X_2 = 0.4$

7. a) Give significance of load flow studies. Give classification of buses for load flow studies. **6**

b) Draw the flow chart of Gauss - Seidal iterative method without P - V Bus. **9**

c) Compare G. S method & Newton Raphson method for load flow solution. **5**

OR

8. 50 Hz synchronous machine is transferring power to infinite bus over a transmission network. The transfer reactances in pu between machine and infinite bus are **20**
Prefault : 0.65
During fault : 4.0
Post Fault : 2.0
Prefault power transfer is 1.0 pu
Voltage of infinite bus is 1.0 pu
Voltage behind transient reactance is 1.5 pu
Inertia Constant H = 3.5 pu
Determine variation of rotor angle and velocity versus t using modified Eulers method.
Take time step of 0.05 sec
Fault is cleared at 0.1 sec. Carry out calculations upto 3 iterations.

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