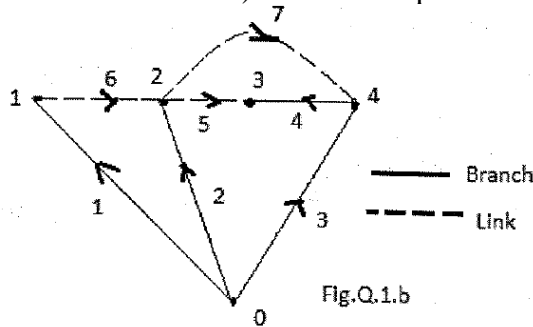


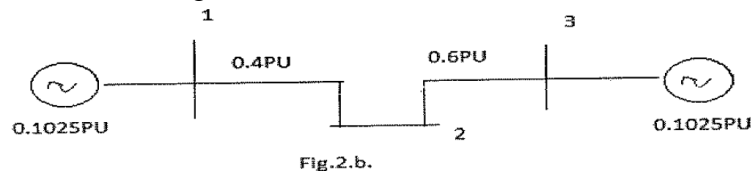


- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.
 5. Use of non programable electronic calculator is permitted.

1. a) Explain in brief the following terms. 8
- i) Network graph
 - ii) Tree of a graph
 - iii) Primitive network
 - iv) Cutset
- b) For a graph shown in fig. Q. 1 (b) Obtain. 8
- i) Bus incidence matrix A
 - ii) Branch-path incidence matrix K
 - iii) Basic cut Set incidence matrix B
 - iv) Basic loop incidence matrix C

**OR**

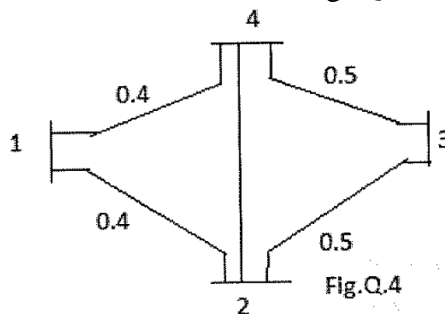
2. a) Derive an expression for loop impedance matrix using singular transformation. 8
- b) Find YBR for a power system shown in fig. Positive sequence reactance of the components are marked on diagram. 8



3. a) Derive the equations for formation of Bus impedance Matrix Z_{bus} , when a branch is added between node Pth and qth of a partial network having no mutual coupling Start from performance equations and representation of partial network for addition of Branch. 8
- b) Using suitable transformation matrix 'T' show that the phase variables in power system can be transformed into new set of 012 variables given by:
- $$Z_{pq}^{012} = (T^*)^t Z_{pq}^{abc} T,$$
- Where T is symmetrical component transformation matrix. 8

OR

4. For the system shown in fig. Q. 4 Form the bus impedance matrix through an algorithm. Self impedance of different elements are shown in fig. Q. 3 select bus – 1 as reference. 16



5. a) Draw a flow chart for load flow analysis by Newton-Raphson method NR using bus admittance matrix include the voltage controlled buses in flow chart. 12
- b) What is the significance of load flow analysis. 4

OR

6. a) Write in brief about significance of slack bus. 4
- b) Draw a computer flow chart for load flow analysis by Gauss-Seidal Iterative method using the bus admittance matrix. 12
7. a) For a Three phase to ground fault at bus 'P' in a power system derive an expression for: 12
- i) Fault current
 - ii) Faulted bus voltage
 - iii) Voltages at other buses during fault
 - iv) Current through network elements during fault.
- b) Explain necessity of short circuit studies. 4

OR

8. a) Represent three phase power system for short circuit studies for a fault at Bus 'P'. 4
- b) For a line to ground fault at Bus 'P' in power system derive an expression for: 12
- i) Faulted bus voltage
 - ii) Fault current
 - iii) Voltage at other buses
9. a) State the assumptions made for transient stability studies. 4
- b) With the help of a flow chart, discuss the algorithm to be used for transient stability study of power system which employs the modified Euler's method. 12

OR

10. a) With the help of flow chart discuss the algorithm to be used for transient stability analysis of power system employing of power system employing RK4 method (Runga Kutta IV) 12
- b) Explain the objectives of transient stability studies. 4
