

Line :  $x_1 = x_2 = 0.4$ ;  $x_0 = 0.7$

If the live to ground fault takes place at bus 3; find :

- (i) Total fault current
- (ii) Bus voltages during fault

Assume system to be unloaded and prefault bus voltage of 1.0 PU. 20

- 6. (a) Derive the swing equation. 4
- (b) State the assumption made for transient stability studies. 4
- (c) With the help of a flow chart, discuss the algorithm to be used for transient stability study of power system which employs the R-K 4<sup>th</sup> order method ? 12

VRK/KS/14/3148/3469

Faculty of Engineering & Technology  
Eighth Semester B.E. (Electrical) / Eighth Semester  
B.E.P.T. (Electrical) Examination  
**COMPUTER APPLICATIONS IN ELECTRICAL  
ENGINEERING**  
Sections—A & B

Time—Three Hours] [Maximum Marks—80

- (1) All questions carry marks as indicated.
- (2) Answer **TWO** questions from Section A and **TWO** questions from Section B.
- (3) Assume suitable data wherever necessary.
- (4) Illustrate your answers wherever necessary with the help of neat sketches.
- (5) Use of Non-Programmable Electronic Calculator is permitted.

**SECTION—A**

- 1. (a) Define the following terms :
  - (i) Basic Cut Set Incidence Matrix
  - (ii) Bus Incidence Matrix
  - (iii) Branch Path Incidence Matrix
  - (iv) Basic Loop Incidence Matrix. 4
- (b) Derive the equation for obtaining Loop Impedance Matrix by singular transformation. 6

- (c) For the network shown in fig. Q. 1(c) form  $Y_{Bus}$  using singular transformation. Reactances of the elements are shown in fig.

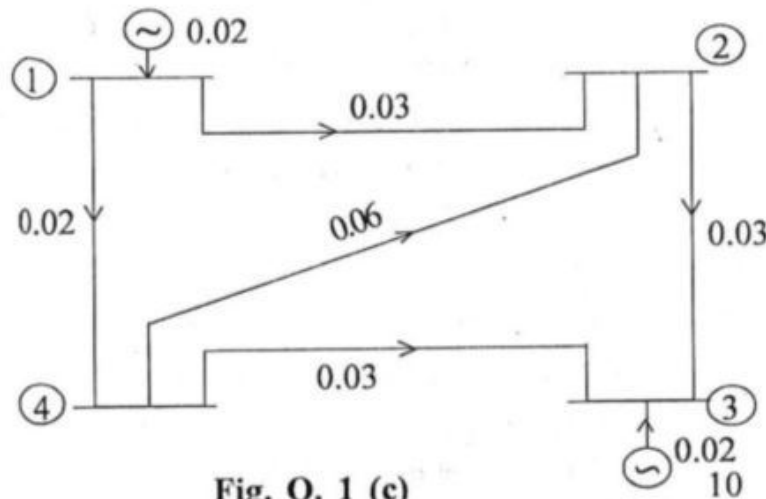


Fig. Q. 1 (c)

2. (a) Derive an expression for elements of the bus impedance matrix for addition of a new branch to the existing partial network. 8
- (b) Obtain  $Z_{Bus}$  using building algorithm for power system in Fig. Q. 2(b). The values indicated in figure are self reactances in P.U. 12

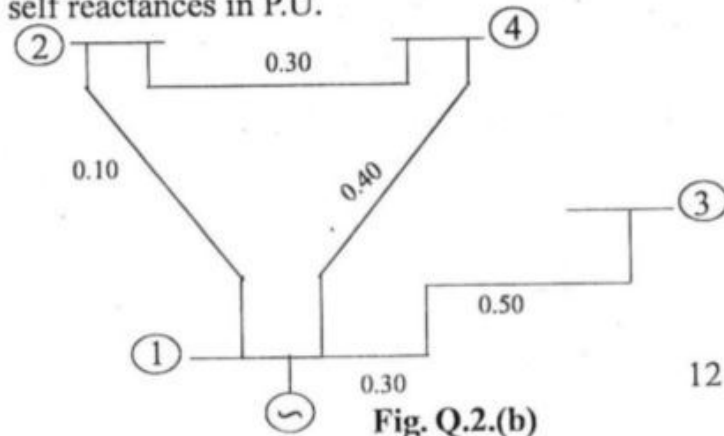
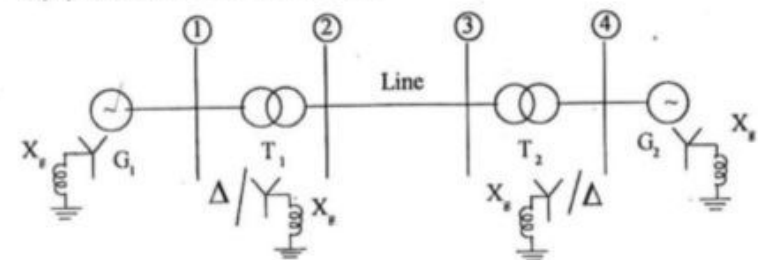


Fig. Q.2.(b)

3. (a) Show that three phase components, stationary and rotating can be represented by diagonalized matrix form. 8
- (b) Show that the transformation matrix  $T$  is a unitary matrix. 4
- (c) How three phase network component is represented in impedance and admittance form? Write down the performance equation of the three phase element in both these forms: 8

### SECTION—B

4. (a) Give and explain flow chart for load flow solution in power system by Gauss-Seidel iterative method using bus admittance matrix. Explain how the procedure is modified to take into account the voltage controlled buses. How buses are classified on the basis of specifications in load flow problem? 14
- (b) Compare the performance of Gauss Seidel and Newton-Raphson methods for load flow solution. 6
5. Sequence reactance data for the system shown in figure. 5(b) is as under in (PU):



$$G_1 : x_1 = x_2 = 0.2; \quad x_0 = 0.08; \quad x_g = 0.03$$

$$G_2 : x_1 = x_2 = 0.3; \quad x_0 = 0.1; \quad x_g = 0.03$$

$$T_1 \text{ \& } T_2 : x_1 = x_2 = x_0 = 0.1; \quad x_0 = 0.1; \quad x_g = 0.03$$