Unit III

5. Give an algorithm to solve load flow equations using decoupled load flow. Consider both PQ and PV buses. **15**

6. The following is the system data for a load flow solution :

The line admittances :

Impedance for sample system :

Bus Code	Admittance
1-2	2-j8.0
1-3	1-j4.0
2-3	0.666+j2.664
2-4	1-j4.0
3-4	2-j8.0

The schedule of active and reactive powers are :

Bus Code	P	Q	V	Remarks
1	–	–	1.06	Slack
2	0.5	0.2	1+j0.0	PQ
3	0.4	0.3	1+j0.0	PQ
4	0.3	0.1	1+j0.0	PQ

Determine the voltages at the end of first iteration by using Gauss-Siedel method. Take $\alpha = 1.6$. **15**

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H-22

B. Tech. EXAMINATION, Dec. 2017

(Eighth Semester)

(B. Scheme) (Re-appear Only)

(EE, EEE)

EE-404-B

COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Describe in detail the power flow equations of transmission lines. **15**

2. (a) Define and explain the following : **6**

(i) tree

(ii) co-tree

(iii) link

(iv) graph with the help of examples.

(b) Find fundamental cut-set matrix and obtain KCL equations of fig. (1). **9**

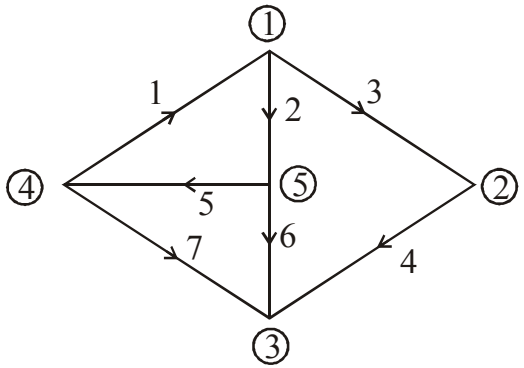

Fig. 1

Unit II

3. (a) Describe the terms primitive admittance matrix and incidence matrix. **6**

(b) Describe in detail the steps involved in the building algorithm for the bus in impedance matrix. **9**

4. (a) Develop an expression for Z_{Bus} (Bus impedance matrix) using bus incidence matrix A formulation. **7**

(b) A primitive Y matrix is :

$$\begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & 4 & 5 \end{array} \\ \begin{pmatrix} 2.083 & -0.417 & 0 & -1.042 & 0 \\ -0.417 & 2.083 & 0 & 0.208 & 0 \\ 0 & 0 & 2.0 & 0 & 0 \\ -1.042 & 0.208 & 0 & 3.021 & 0 \\ 0 & 0 & 0 & 0 & 5 \end{pmatrix} \end{array}$$

Form Y_{Bus}. **8**

Unit IV

7. (a) Derive an expression for fault current for single line-to-ground fault. **7**

(b) A 3-phase, 11 kV, 25 MVA generator with X_o = 0.05 p.u., X_1 = 0.2 p.u. and X_2 = 0.2 p.u. is grounded through a reactance of 0.3. Calculate the fault currents for a single line to ground fault. **8**

8. (a) Express unbalanced phase currents in a 3-ϕ system in terms of symmetrical components. **7**

(b) The voltages across a 3-ϕ unbalanced load are V_a = 300 V, $V_b = 300\angle -90^o$ and $V_c = 800\angle 143.1^o$ respectively. Determine the sequence components of voltages. Phase sequence is *abc*. **8**

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