

B. Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Final Year)

ELECTRICALS & ELECTRONICS ENGINEERING

Paper - III : Computer Aided Power System Analysis

Time : 3 Hours

Maximum Marks : 75

Answer question No. 1 compulsory

(15)

Answer ONE question from each unit

(4 x 15 = 60)

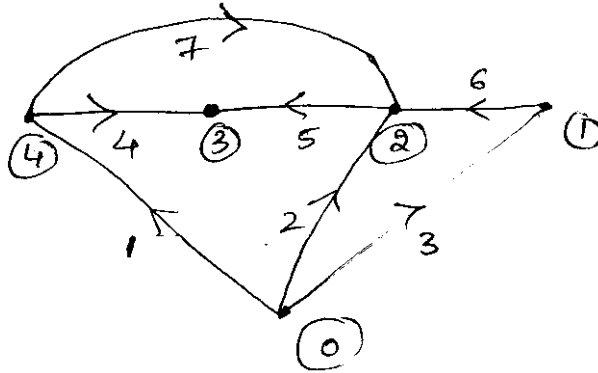
- 1) a) Define sub graph.
- b) What is a loop?
- c) Differentiate tree and co-tree.
- d) What is Loop Incidence matrix?
- e) What is the rank of a bus incidence matrix if 'n' number of nodes are there?
- f) What is the size of the impedance matrix if a link is added to the existing network?
- g) What are the two types of sequence quantities?
- h) What is transposition of lines?
- i) Write any two properties of component 'a'.
- j) Write the fault admittance matrix for a line to ground fault.
- k) What is the significance of load flow studies?
- l) What are the parameters specified at generator bus?
- m) What is the purpose of acceleration factors in load flow studies?
- n) Define transient stability.
- o) Write swing equation.

UNIT - I

2) Derive the expressions for bus admittance and impedance matrices by singular transformation.

OR

3) a) For the oriented connected graph, obtain the Bus incidence matrix A, Branch path incidence matrix k and basic cutset matrix B.



b) For the above graph, prove $A_b k^t = U$.

UNIT - II

4) Three bus system having reference node '4' comprises the line impedance in pu as follows. $z_{14} = j 1.0$, $z_{12} = j 0.2$, $z_{24} = j 1.25$, $z_{23} = j 0.05$. Find z_{bus} for the system by the z_{bus} building algorithm.

OR

5) a) Obtain the symmetrical components of a set of unbalanced currents $I_a = 1.6 \angle 250^\circ$, $I_b = 1.0 \angle 180^\circ$ and $I_c = 0.9 \angle 132^\circ$. Also find the neutral current.

b) Bring out the relationship between symmetrical components and unbalanced phasors.

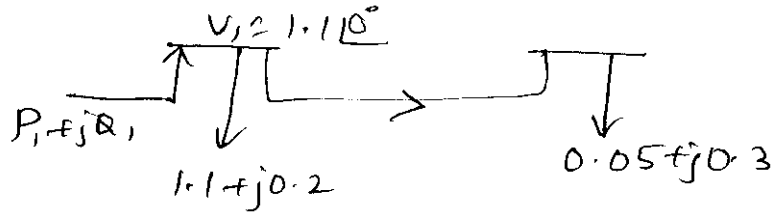
UNIT - III

6) Derive the expression for diagonal and off-diagonal elements of the Jacobian matrix of N-R (Polar form) method.

OR

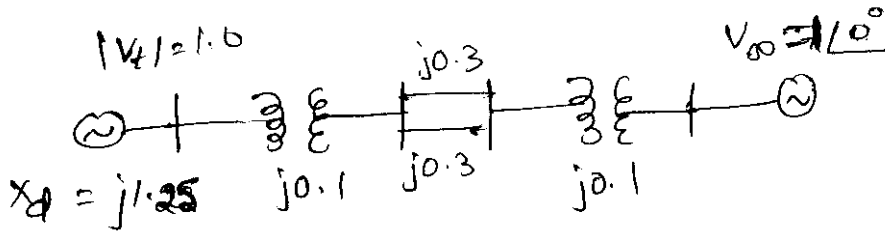
7) A 2-bus system has been shown in figure. Determine voltage at bus 2 by G.S method after 2 iterations.

$$y_{11} = y_{22} = 1.6 \angle -80^\circ \text{ pu}; y_{21} = y_{12} = 1.9 \angle 100^\circ \text{ pu}, v_1 = 1.1 \angle 0^\circ.$$



UNIT - IV

- 8) A generator supplies 1.0 pu power to an infinite bus as shown in figure. The terminal voltage and infinite bus voltage are 1.0pu. All the reactances are 1.0pu. All the reactances are on a common base. Determine steady state stability limit.
- When both lines are in
 - When one line is switched off.



OR

- What are the factors that affect transient stability.
 - Discuss the various techniques adopted to improve transient stability limit.

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