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H22

B. Tech. EXAMINATION, 2020

(Eighth Semester)

(B Scheme)

(Main & Re-appear)

EE, EEE

EE404B

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. (a) Define the following with example : **8**

(i) Oriented graph

(ii) Primitive Network

(iii) Cotree

(iv) Tree.

(b) Why load flow analysis in a power system in necessary ? Explain. **7**

2. Write short notes on the following : **15**

(a) Travelling Waves

(b) Circle Diagram.

Unit II

3. (a) Prove $Y_{BUS} = A^t[y]A$.

(b) Prove that $Z_{LOOP} = C^t[z]C$.

4. (a) What is Primitive Network ? The data relating to the passive elements is given in the below table. Obtain (i) Primitive Impedance matrix Z; (ii) Primitive Admittance matrix Y :

Element	**Self Impedance**		**Mutual Impedance**	
No.	$Z_{pq,\ pq}$		$Z_{pq,\ rs}$	
	Bus Code (*p-q*)	**Impedance in** *pu*	**Bus** (*r–s*)	**Impedance in** *pu*
1	1–2	*j*0.45	–	–
2	2–3	*j*0.30	1–2	*j*0.15
3	1–3	*j*0.60	1–3	*j*0.25

(b) Derive the generalized algorithm for finding the elements of bus impedance matrix when a branch is added. **9**

Unit III

5. (a) Explain with a flow chart and equation how the load flow analysis is carried out using Gauss-Siedel Method. **9**

(b) Solve the following equations by the N-R method : **15**

$$X^2_1 - 4X_2 - 6 = 0$$

$$3X_1 - X_2 - 4 = 0$$

6. (a) Discuss the algorithm for fast decoupled load flow method and mention the assumptions made in FDLF. **10**

(b) List the comparison of Gauess Siedel and NR load flow method. **5**

Unit IV

7. A dead earth fault occurs on one conductor of a 3-conductor cable supplied by a 10,000 kVA 3-phase alternator with earthed neutral. The alternator has +ve, –ve and

zero phase sequence impedances of (0.7 + j 4.2), (0.3 + j 0.5) and 0.42 ohm per Phase. The corresponding line to neutral values for the cable upto the fault poisiton are (0.35 + j 0.25), (0.36 + j 0.25) and (2.8 + j 0.95) ohms. Find (i) fault current, (ii) sequence components of the current in each line and (iii) voltage of the sound lines to earth at the fault. The generator is excited to give 6600 V between lines on open circuit. **15**

8. A fault occurs at F in the network shown in the given figure. Find the fault current for (i) line fault, (ii) line to ground fault. The data about the system is as follows :

G = 2,000 kVA, reactance = 10%, solidly earthed

T = 2,000 kVA, 6.6/11 kV, reactance 5%; solidly earthed on 11 kV side.

Cable, jX = 0.5 ohms at 11 kV

T_2 = 2,000 kVA, 11/6.6 kV resistance 5%, solidly earthed on 6.6 kV side. **15**