

Date: 04/01/2016

Student Exam No: _____

GANPAT UNIVERSITY
M.TECH SEM-I (ELECTRICAL ENGINEERING)
REGULAR EXAMINATION NOV-DEC-2015

3EE102:-COMPUTER METHODS IN POWER SYSTEM ANALYSIS

Time: 3 Hours

Total Marks:-60

- Instructions:** - 1. Attempt all questions.
 2. Make suitable assumptions wherever necessary.
 3. Figures to the right indicate full marks.

SECTION-I

- Que-1 (A) Derive the following relation : $Z_{loop} = B[z] B^T$ [05]
 (B) Explain briefly fast decoupled load flow method for solving the nonlinear load flow equations. [05]

OR

- Que-1 (A) Fig.1 shows a five bus power system. Each line has an impedance of $0.05 + j0.15$ pu. The line shunt admittances may be neglected. The bus power and voltage specification are given below: [10]

Bus number	Generator		load		Voltage	Bus Type
	P_G	Q_G	P_L	Q_L		
1	Not specified	Not specified	1.0	0.5	$1.02 \angle 0^\circ$	Slack
2	2	Not specified	0	0	1.02	PV
3	0	0	0.5	0.2	Not specified	PQ
4	0	0	0.5	0.2	Not specified	PQ
5	0	0	0.5	0.2	Not specified	PQ

Find Y_{bus} (b) Find Q_2, δ_2, V_3, V_4 and V_5 after the first iteration using Gauss seidal method. Assume $Q_{2min} = 0.2$ pu and $Q_{2max} = 0.6$ pu.

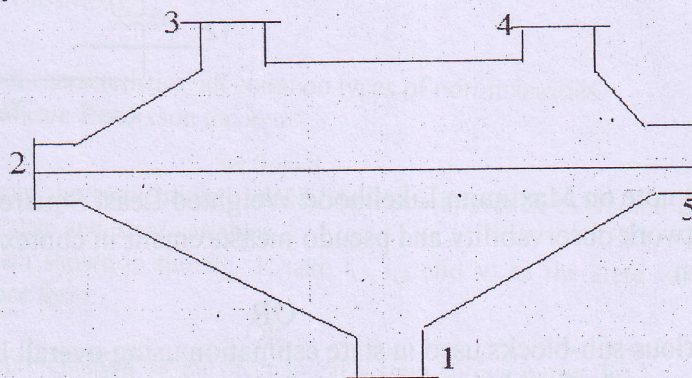


Figure-1

- Que-2 (A) Explain various types of modification and develop Z bus building algorithm used for short circuit analysis. [05]
 (B) Discuss the sequence networks for transformer and Draw the zero sequence network for (1) star-delta transformer with neutral earthed (2) Delta-Delta transformer (3) Delta-Star transformer. [05]

OR

- Que-2 (A) Derive the fault current in Line-to-Line fault on an unloaded generator in terms of Symmetrical components. [05]
(B) Discuss the short circuit current of synchronous machine and draw the envelop of short circuit current also discuss transient, sub transient and steady state reactance. [05]
- Que-3 (A) What do you mean by load forecasting? Explain any one load forecasting method. [05]
(B) Compare the load flow analysis methods in terms of convergence, solution accuracy, time, Memory requirement, complexity, types of system and Programming. [05]

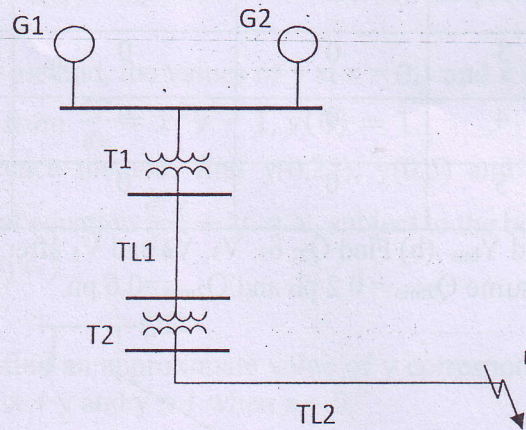
SECTION-II

- Que-4 (A) Derive the formation of Y bus matrix of given 'n' bus power system using direct inspection method. [05]
(B) Draw and explain flow chart of AC power flow analysis with contingency Selection. [05]

OR

- Que-4 (A) Explain the following with respect to power system security [04]
(i) Generation shift factor (ii) Line outage distribution factor.
(B) For the radial network shown in figure, a 3-phase fault occurs at F. Determine the fault current and the line voltage at 11 kV bus under fault conditions. [06]

G_1 : 10 MVA, 11 kV, $X = 15\%$
 G_2 : 10 MVA, 11 kV, $X = 12.5\%$
 T_{11} : 10 MVA, 11/33 kV, $X = 10\%$
 TL_{11} : 30 km, $Z = (0.27 + j 0.36) \Omega/\text{km}$
 T_{22} : 5 MVA, 33/6.6 kV, $X = 8\%$,
 TL_{22} : 3 km, $Z = (0.135 + j 0.08) \Omega/\text{km}$



- Que-5 (A) Write short note on Maximum Likelihood Weighted Least Squares Estimation. [05]
(B) Explain network observability and pseudo measurement in context with the State estimation in power system. [05]

OR

- Que-5 (A) Explain various sub-blocks used in state estimation using overall block diagram. [05]
(B) What is the need of real time and computer control of power system? Also, explain the importance and advantages of SCADA and energy management centers in power system. [05]

- Que-6 (A) Write the short note on bounding. [05]
(B) Explain the transient analysis of transmission line. [05]

END OF PAPER
Best of Luck