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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech. (EE) (2018 Batch) (Sem.-1)

POWER SYSTEM ANALYSIS

Subject Code : MTEE-101-18

M.Code : 75215

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

1. a) Explain sparsity technique and optimal ordering. (4)
b) The following is the system data for a load flow solution. The line admittances :

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

The schedule of active and reactive powers :

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

Determine the voltages at the end of first iteration using Gauss-Seidal method. Take $\alpha = 1.6$. (8)

2. a) With the help of a neat flow chart, explain the Newton-Raphson method of load flow solution when the system contains voltage-controlled buses in addition to swing bus and load bus. (8)
- b) Compare G-S method and N-R method of load flow solutions. (4)
3. Discuss symmetrical component analysis of unsymmetrical faults. How is fault computation done using Z bus formulation? (12)
4. a) Derive the expression for the fault current and terminal voltage for a line to line fault occurs at the terminal of an unloaded 3-phase alternator. Assume that the alternator has an isolated neutral. (6)
- b) A 30 MVA, 11kV generator has $Z_1 = Z_2 = j0.2$ pu, $Z_0 = j0.05$ pu. A line to ground fault occurs on the generator terminals. Find the fault current and line to line voltages during the fault conditions. Assume that the generator neutral is solidly grounded. (6)
5. Write short notes on :
 - a) State estimation of power systems. (6)
 - b) State estimation of the line power flow. (6)
6. Discuss contingency analysis for power system using Brown's Method. (12)
7. a) What is voltage collapse? Explain its causes and prevention methods taken against it. (6)
- b) Draw PV graph for a typical line. What is the use of this graph in voltage stability studies? (6)
8. a) Give a flow chart for a load flow study on a power system using Fast Decoupled load flow method. (8)
- b) Explain why N-R method is preferred to G-S method for load flow studies in power system. (4)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.