

Code: EE7T5A

**IV B.Tech - I Semester – Regular/Supplementary Examinations  
October - 2018**

**COMPUER METHODS IN POWER SYSTEMS  
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

**PART – A**

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22 M

1.

- a) What is the difference between a Node and a Bus in graph theory.
- b) Define Connected network.
- c) What is sparsity?
- d) Define voltage controlled bus.
- e) Give the formula for the size of Jacobian matrix.
- f) Express the steady state load flow equations.
- g) Give any 2 advantages of NR method over GS method of load flow solution.
- h) List out the factors effecting transient stability.
- i) Define power system security.
- j) What is the difference between Transient stability and Dynamic stability?
- k) What is a power system stabilizer?

PART – B

Answer any **THREE** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Derive the relation  $\mathbf{Y}_{bus} = \mathbf{A}^T [\mathbf{y}] \mathbf{A}$  where  $\mathbf{A}$  stands for bus incidence matrix. 8 M

b) Show that the  $\mathbf{Y}_{ii}$  of  $\mathbf{Y}_{bus}$  is sum of all the admittances connected to  $i^{th}$  bus and  $\mathbf{Y}_{ij}$  is negative of  $\mathbf{y}_{ij}$ . 8 M

3. Obtain  $\mathbf{Z}_{bus}$  for the following 4bus system. Where R stands for Reference bus. 16 M

Line No	Bus code	Line Impedance	Type of modification
1	R-1	0.6	1
2	R-2	0.5	1
3	2-3	0.5	2
4	1-3	0.25	4

4. The following is the system data for a Load flow solution. Find bus voltages at the end of first iteration using GS method. Take acceleration factor  $\alpha$  as 1.6.

16 M

Line data		Bus data				
Bus code	Admittance	Bus code	P	Q	V	Type
1-2	2-J8	1	--	--	1.06	slack
1-3	1-J4	2	0.5	0.2	--	PQ
2-3	0.666-J2.66	3	0.4	0.3	--	PQ
2-4	1-J4	4	0.3	0.1	--	PQ
3-4	2-J8					

5. Explain in detail

a) Generation shift factor.

6 M

b) Line outage distribution factors.

10 M

6. a) Define steady state, transient and Dynamic stability related to power system.

6 M

b) Discuss the Modified Euler's Method of studying transient stability using a flow chart.

10 M