

R09

Code: 9A02602

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

POWER SYSTEM ANALYSIS
(Electrical and Electronics Engineering)

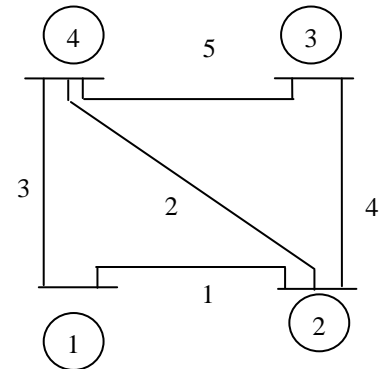
Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) What does basic cutset incidence matrix B obtained from an oriented connected graph represent? What are the entries of this matrix and how are they determined.
- (b) Explain the following terms: (i) Loop. (ii) Basic loop. (iii) Tree.
- 2 Using building algorithm, construct Z_{BUS} for the system whose data is given below. Choose bus 4 as reference.

Element	Self		Mutual	
	Bus code	Impedance	Bus code	Impedance
1	1-2	$j0.5$	1-2	$j0.2$
2	1-4	$j0.4$		
3	2-3	$j0.3$		
4	2-4	$j0.5$		
5	3-4	$j0.2$		



- 3 (a) Derive Expressions for static load flow.
- (b) Explain the necessity of power flow studies in power system
- 4 Describe Fast Decoupled load flow method and give algorithm of it.
- 5 (a) Explain bus bar reactors with a neat sketch.
- (b) Explain the significance of Thevenin theorem in fault calculations with an example.
- 6 A synchronous generator is rated 25 MVA, 11 kV. It is star connected with the neutral point solidly grounded. The generator is operating at no load at rated voltage. Its reactances are $X'' = X_2 = 0.20$ and $X_0 = 0.08$ pu. Calculate the symmetrical sub-transient line currents for:
 - (i) Single line to ground fault.
 - (ii) Double line fault.
 - (iii) Double line to ground fault.
 - (iv) Symmetrical three phase fault.
 Compare these currents and comment.
- 7 (a) Define the following terms:
 - (i) Steady state stability. (ii) Dynamic state stability. (iii) Transient state stability.
- (b) What do you understand about stability limit in power system

~~8 What are the assumptions in classical studies of transient stability? Why the swing equation is so important in the study of transient stability?~~