

R16

Code No: 136DK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, November/December - 2020

POWER SYSTEMS ANALYSIS
(Electrical and Electronics Engineering)

Time: 2 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) How do you obtain an element –node incidence matrix from a given network.
 b) For the power system network shown below figure 1, the primitive data is as given in below Table. Compute the Y_{bus} matrix by taking a mutual-coupling of 0.2 between the elements 4 and 5. [6+9]

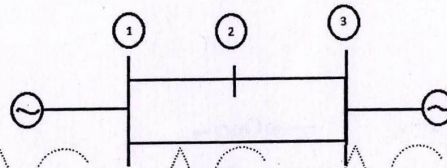


Figure 1

Element Number	Bus Number		Primitive Impedance
	From	To	
1	1	0	0.05
2	3	0	0.10
3	1	2	0.50
4	2	3	0.40
5	1	3	0.25

Table

- 2.a) Discuss in detail about the formation of Z bus.
 b) With an example, Discuss about singular transformation method. [8+7]
- 3.a) Discuss in detail about Bus classification in power flow studies.
 b) Explain in detail about Gauss-Seidel method in complex form without voltage control buses. [6+9]
- 4.a) What are the Jacobian elements? Explain in detail about their significance.
 b) Figure 2 below shows a two-bus DC power system connected by a transmission line whose resistance $R = 0.05$ per unit. The load P on bus 2 is 1.0 per unit. Write the load flow equation and solve it by Newton-Raphson method to obtain the voltage at bus 2. Assume bus 1 as the slack bus having a voltage of 1.0 per unit. Take tolerance limit for convergence equal to 0.001. Determine the power supplied by the slack bus. [6+9]

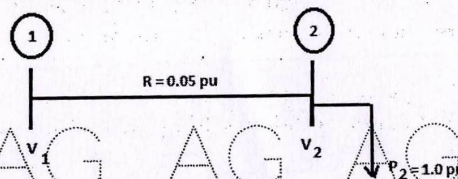


Figure 2

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- 5.a) Explain in detail about decoupled sub matrices of J-matrix.
b) With the help of an example, Explain about decoupled load flow method. [7+8]

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- 6.a) Explain the assumptions of fast decoupled load flow method.
b) What is a DC load flow method? Explain. [8+7]

- 7.a) Explain in detail about the fault calculation of LLG fault without fault impedance.
b) What is a series reactor? Explain its applications. [8+7]

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- 8.a) Discuss about power angle equation with and without neglecting line resistance.
b) What is critical clearing angle? Explain its significance in detail. [8+7]

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