

R15

Code No: 126ZG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, July - 2023

COMPUTER METHODS IN POWER SYSTEMS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) What is the need of formation Z_{BUS} ? [2]
- b) What is the necessity of Bus Incidence Matrix? [3]
- c) Define slack bus. [2]
- d) What is the difference between active and reactive power? [3]
- e) What are the advantages of per unit system? [2]
- f) What is the need of symmetrical component theory? [3]
- g) Define steady state stability. [2]
- h) Define Synchronizing Power Coefficient. [3]
- i) Define transient state stability. [2]
- j) What are the applications of Auto Reclosing and fast operating circuit breakers? [3]

PART - B

(50 Marks)

- 2.a) Derive the Y_{bus} matrix by using Direct inspection method.
- b) The following table gives the line data for a simple four bus system, find Y_{bus} ? [5+5]

Line	R p.u	X p.u
1-2	0.09	0.14
1-3	0.17	0.20
2-3	0.15	0.30
2-4	0.14	0.38
3-4	0.05	0.15

OR

3. Explain the algorithm to modify Z_{BUS} Matrix for addition element from a new bus to reference. [10]

4. The load flow data for a three-bus system is given in table – I and table – II. All buses other than slack bus are PQ type. Assuming a flat voltage start, Find voltages and bus angles at the two buses at the end of first G.S iteration. [10]

Table-1

Line	G(p.u)	B (p.u)
1 –2	1.0	-2.0
1 –3	3.0	-5.0
2– 3	0.656	-2.0

Table – II

Bus	Pi (p.u)	Qi (p.u)	Vi (p.u)	Remarks
1	-	-	1.0410	Slack
2	0.7	-0.4	-	PQ
3	-1.0	0.5	-	PQ

OR

- 5.a) Explain the algorithmic steps for obtaining power flow solution using decoupled load flow method.
 b) Compare different load flow methods. [6+4]
 6. Derive the necessary equations to determine the fault current for a double line fault. Draw sequence networks. [10]

OR

- 7.a) Explain about Symmetrical Component Transformation.
 b) Explain about per unit representation of three phase power system. [5+5]
 8.a) Attain the Power Angle curve with necessary equations.
 b) Define the terms: i) Dynamic State stability ii) Steady State Stability power limit iii) Transfer Reactance. [5+5]

OR

9. What are the methods to improve steady state stability? And explain. [10]
 10. Explain the procedure to determine the Critical Clearing Angle with necessary equations. [10]

OR

11. Explain about point by point method for solution of swing equation. [10]

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