



VIT
UNIVERSITY
(Estd. by 3 of UGC Act 1920)

23BEE0009

C1+TC1

SCHOOL OF ELECTRICAL ENGINEERING

B.Tech-EEE CONTINUOUS ASSESSMENT TEST - I Fall Semester 2025-26

Course Code : BEEE306L
Course Name : Power System Analysis
Faculty Name: Prof. S.Prabhakar Karthikeyan

Date of Exam : 19th August 2025
Max. Marks : 50
Duration : 90 minutes

General instruction(s):

Answer all the Questions

Assumptions can be made wherever necessary

Rough work should not be done on question paper. It will be treated as malpractice.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Course Outcomes Statements:

CO1: Formulate the network matrices and compute load flow solutions for power systems

CO2: Identify and analyze different types of faults to calculate the transient rating of protection devices

CO2: Identify and analyze different types of faults to calculate the transient rating of protection devices		CO's	Marks	BT																								
S. No	Questions																											
1.a	Discuss the role of load flow studies in evaluating the feasibility and reliability of connecting a newly planned industrial facility at VIT, Vellore with a 10 MW load to the existing power distribution network?	1	5	3																								
1.b	Enumerate the significance of Short circuit studies. How Thevenin's theorem is used to solve short circuit problems.	2	5	3																								
2	The parameters of a four bus system are shown below in line data. Draw the network diagram and find the admittance matrix. Also find the modified matrix when the line between buses 2 to 4 is removed. Line Data <table><tr><th>S. No.:</th><th>Bus code</th><th>Line Impedance in (p.u)</th><th>Half line charging admittance in (p.u)</th></tr><tr><td>1</td><td>1-2</td><td>$0.2+j0.8$</td><td>$j0.02$</td></tr><tr><td>2</td><td>2-3</td><td>$0.3+j0.9$</td><td>$j0.03$</td></tr><tr><td>3</td><td>2-4</td><td>$0.25+j1.0$</td><td>$j0.04$</td></tr><tr><td>4</td><td>3-4</td><td>$0.2+j0.8$</td><td>$j0.02$</td></tr><tr><td>5</td><td>1-3</td><td>$0.1+j0.4$</td><td>$j0.01$</td></tr></table>	S. No.:	Bus code	Line Impedance in (p.u)	Half line charging admittance in (p.u)	1	1-2	$0.2+j0.8$	$j0.02$	2	2-3	$0.3+j0.9$	$j0.03$	3	2-4	$0.25+j1.0$	$j0.04$	4	3-4	$0.2+j0.8$	$j0.02$	5	1-3	$0.1+j0.4$	$j0.01$	1	10	2
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3	Determine the Z_{bus} matrix using bus building algorithm for the network shown in Figure. 1. Preserve all the nodes shown. The values of the impedances are shown in per unit.	1	10	2																								

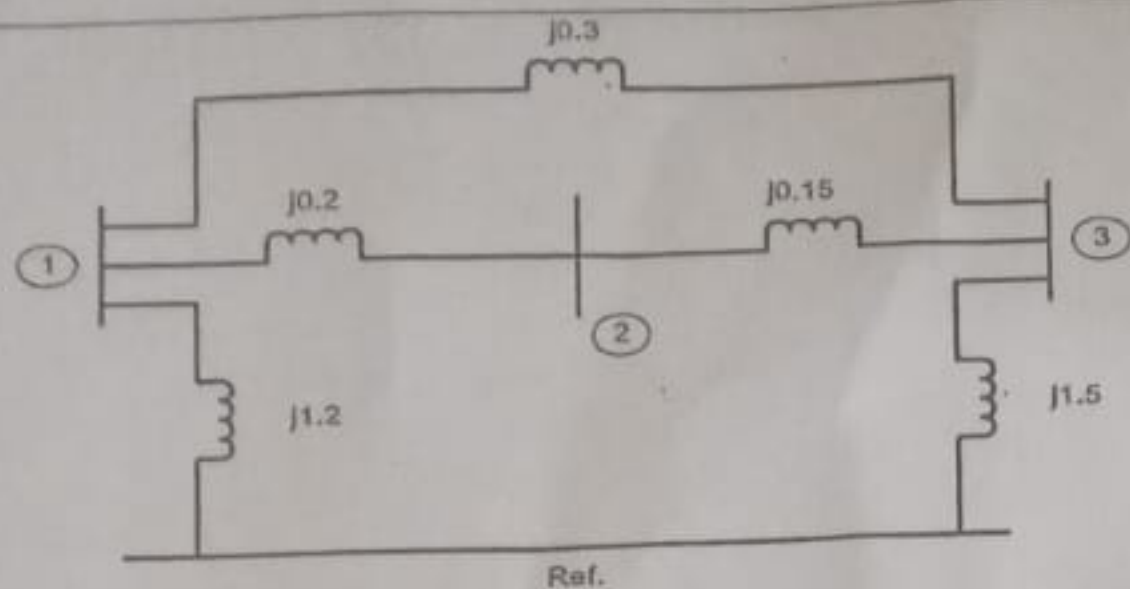


Figure 1

4.	It is required to carry out the load flow study on a 10 bus, 400 kV Southern grid of India for October-2024 load conditions. The system has 4 generators and 6 load buses. The system peak load in October-2024 was found to be 8870 MW, 4980 MVAR. Answer the following questions with reference to the above system?	1		3
a	What is the order of the admittance matrix and the impedance matrix?		1	
b	A slack bus should be a generator bus. True or False. Justify your answer?		2	
c	Will there be any change in the order of the Admittance matrix if the study is carried out for half peak load condition [4435 MW, 2490 MVAR] & if so what is the new order?		2	
d	List any two assumptions involved before the process of load flow studies?		2	
e	Write the generalized voltage expression used to calculate at bus number 4?		2	
f	What is the X/R ratio of all the lines involved in the above case?		1	
5	Compare Gauss Seidel's method and Newton Raphson's method for Load flow studies with necessary illustration?	1	10	2