Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

BE/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Fifth Semester

Electrical and Electronics Engineering

EE3501 – POWER SYSTEM ANALYSIS

Regulations - 2021

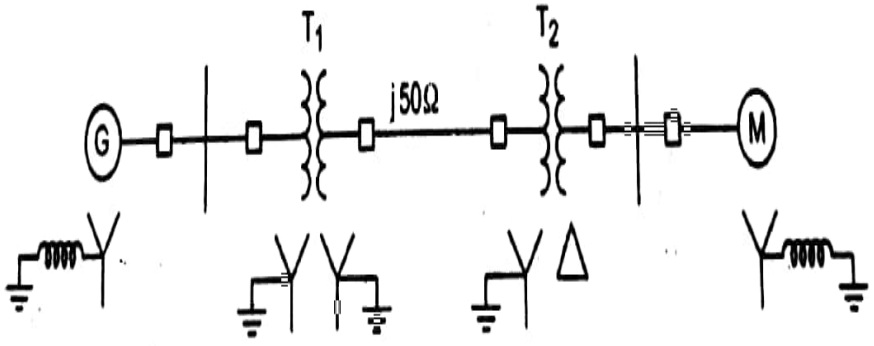
Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	What is pu? State its advantages.	RE	1	2
2.	Illustrate the new p.u. impedance if the new base MVA is twice the old base MVA.	UN	1	2
3.	Classify the busses with their known and unknown quantities.	RE	2	2
4.	Relate the necessity of swing bus or slack bus in power system.	UN	2	2
5.	What is solid fault or bolted fault?	RE	3	2
6.	Define fault MVA.	RE	3	2
7.	Draw the sequence network of Δ-Δ connected transformer.	UN	4	2
8.	What are the symmetrical components of a three-phase system?	RE	4	2
9.	Define transient stability of a power system.	RE	5	2
10.	State equal area criterion.	RE	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)*

Q.No		*Questions*	*BTL*	*CO*	*Marks*
11.	a	Draw the per unit reactance diagram for the power system shown below. Neglect resistance and use a base of 100 MVA, 220kV in 50 ohms line. The ratings of the generator, motor and transformer are: G: 40MVA, 25kV, X"=20%, M: 50MVA, 11kV, X'=30%, YY Transformer: 40MVA, 33Y/220Y kV, X=15%, YΔ Transformer: 30MVA, 11Δ/220Y kV, X=15%, Load:11kV,50MW+j68MVAR	AP	1	13

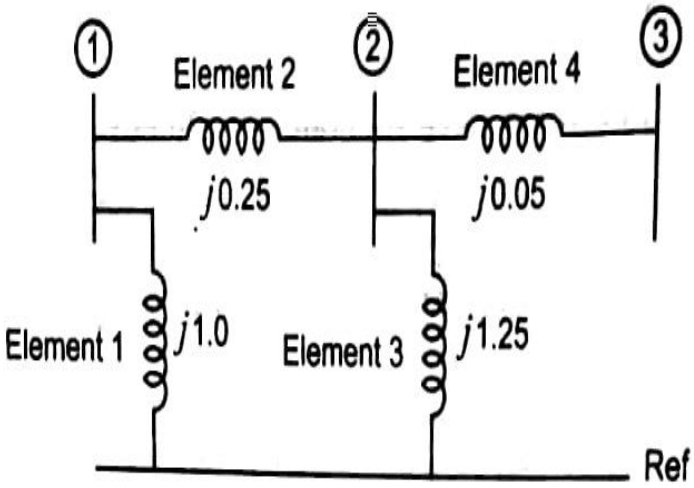


Or

	b	Form Y_{bus} by singular transformation method.				AP	1	13

S. No.	Self		Mutual	
	Bus code	Impedance	Bus code	Impedance
1	1 – 2	0.5	1 – 2	0.1
2	1 – 3	0.6		
3	3 – 4	0.4		
4	2 – 4	0.3		

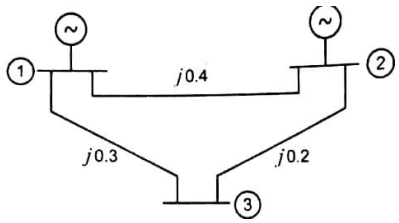
12.	a	Explain the step by step algorithm for load flow solution including voltage controlled buses using Gauss Seidel method.	UN	2	13
		Or			
	b	Explain the step by step algorithm for load flow solution using Newton Raphson method.	UN	2	13
13.	a i	Describe the approximations in short circuit analysis.	UN	3	4
	ii	Explain the short circuit analysis using Thevenin's theorem.	UN	3	9
		Or			
	b	Determine Z_{bus} using bus building algorithm by adding the lines as per increasing element number. The reactance diagram is shown below	AP	3	13



14.	a	Derive the expression for fault current in line to ground fault on an unloaded generator in terms of symmetrical components.	AN	4	13
		Or			
	b	Derive the expression for fault current in line to line fault on an unloaded generator in terms of symmetrical components.	AN	4	13
15.	a	State the applications of equal area criterion as applicable to SMIB system.	AN	5	13
		Or			
	b	Derive the swing equation of a single machine connected to an infinite bus system.	AN	5	13

*PART – C (Marks 1*15 = 15)*

Q.No		*Questions*	*BTL*	*CO*	*Marks*
16.	a	With a neat flow chart describe the solution of swing equation by modified Euler method.	AN	5	15
		Or			
	b	For the system shown determine the voltages at the end of first iteration by Gauss – Seidel method and also find the slack bus power. Assume base MVA as 100.	AP	2	15



Bus No.	Voltage	Generator		Load		Q_{min}	Q_{max}
		P	Q	P	Q		
1	1.05	-	-	-	-	-	-
2	1.02p.u	0.3p.u	-	-	-	-10	100
3	-	-	-	0.4p.u	0.2p.u	-	-