U.S.N.										

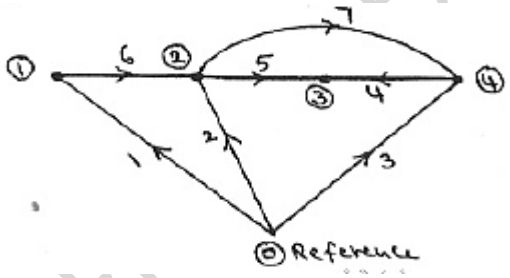
B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: VII**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 19EE7PCPS2 **Max Marks: 100**
Course: Power Systems-II

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	CO	PO	Marks
1	a)	Derive an expression for off-nominal turns ratio of transformer.	CO3	PO1	**06**
	b)	For the graph given in fig. 1 (b), Construct matrices A, B, C, and K, taking bus '0' as reference. Consider elements,1,2,3, as branches.  Fig. 1 (b)	CO2	PO2	**08**
	c)	For the data shown in Table 1. (c), Form Ybus using Singular transformation method. Take bus 1 as ref node.	CO2	PO2	**06**

Element Number	Between Buses	Self-admittance	Mutual admittance
1	1-2	j 2	-
2	1-3	j 3	j 0.5 (Element 1)
3	2-3	j 4	j 0.5 (Element 1)
4	1-2	j 5	-

Table 1.(c)

		UNIT - II			
2	a)	How buses are classified in power systems? What is the significance of Slack bus?	CO1	PO2	**06**
	b)	For the data shown in Table 2. (b), obtain voltages at all buses at the end of first iteration using G.S method.	CO2	PO2	**14**

Element Number	Between Buses	Line Impedance (p.u)	Line charging admittance (p.u)
1	1-2	0.25 j	2 j
2	1-3	0.5 j	1 j
3	2-3	0.75 j	0.5 j
4	1-2	0.5 j	0.5 j

Bus	P_G (p.u)	Q_G (p.u)	P_D (p.u)	Q_D (p.u)	Voltage (p.u)
1	--	--	--	--	1.06
2	0.5	--	0.2	--	1.02
3	0.5	0.3	0.3	0.1	--

Table 2(b)

OR

3	a)	Explain G.S method of load flow analysis with flow chart.	*CO1*	*PO1*	**06**
	b)	For the data shown in Table 2. (b), obtain voltages at all buses at the end of first iteration using G.S method. Consider $\alpha = 1.2$	*CO2*	*PO3*	**14**

Element Number	Between Buses	Admittance (p.u)
1	1-2	2 j
2	1-3	4 j
3	2-3	6 j
4	1-2	5 j

Bus	P_G (p.u)	Q_G (p.u)	P_D (p.u)	Q_D (p.u)	Voltage (p.u)
1	--	--	--	--	1.06
2	0.5	--	0.2	0.2	--
3	0.5	0.3	0.3	0.1	--

UNIT - III

4	a)	Explain N.R method of load flow analysis with flow chart.	*CO1*	*PO1*	**08**
	b)	A system consists of two buses 1 and 2, and line of impedance $(0.2 + j0.5)$ p.u is connected between these buses. Generator is connected at bus 1 with a voltage of 1.04 p.u and a load of $(0.2 + j0.5)$ p.u is connected at bus 2. Find the voltage at bus 2 at the end of first iteration using FDLF method.	*CO2*	*PO3*	**12**

UNIT - IV

5	a)	Derive an expression for loss-co-efficients for a two generating plant in economic operation of power systems.	*CO4*	*PO1*	**10**

		b)	A two bus system is shown in fig 5(b), if 75 MW of power is imported to bus-1 from bus-2, a loss of 5 MW is incurred, find the required generation for each plant and power received by load when the plant incremental cost is 20. the incremental fuel cost of two plants are $\frac{dF_1}{dP_{G_1}} = 0.03P_{G_1} + 15\ Rs/MWh$ $\frac{dF_2}{dP_2} = 0.05P_{G_2} + 18\ Rs/MWh$ 	*CO4*	*PO2*	**10**
			UNIT - V			
	6	a)	With a neat block diagram, explain operating states of power systems.	*CO1*	*PO1*	**10**
		b)	With neat block diagram explain speed governor system of ALFC.	*CO2*	*PO2*	**10**
			OR			
	7	a)	With a neat block diagram, explain digital computer configuration of power system.	*CO1*	*PO1*	**10**
		b)	With neat block diagram explain closing loop of ALFC.	*CO2*	*PO2*	**10**

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