

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2026

Power System Analysis - II

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks , L: Bloom's level , C: Course outcomes.

Module - 1			M	L	C
Q.1	a.	Explain with an example, primitive networks in, (i) Impedance form (ii) Admittance form	6	L2	CO1
	b.	Explain with an example, (i) Oriented graph (ii) Basic cutsets (iii) Basic loops	6	L2	CO1
	c.	For the network shown in Fig. Q1 (c) below, draw the graph and mark a tree. How many trees will this graph have? Mark the basic cutsets and basic loops.	8	L3	CO1

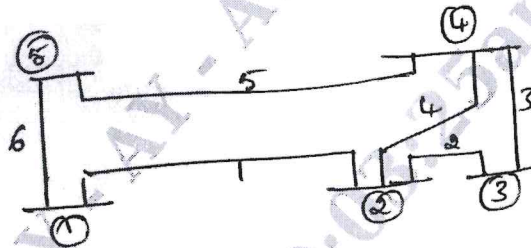


Fig. Q1 (c)

OR

Q.2	a.	For the system shown in Fig. Q2 (a). Obtain Y_{Bus} by inspection method. Take bus ① as reference. The marked impedances are in p.u.	6	L3	CO1
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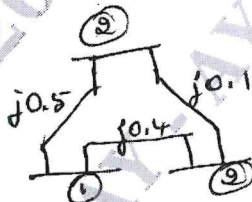


Fig. Q2 (a)

- b. For the network shown in Fig. Q2 (b) form the bus incidence matrix A, branch path incidence matrix K and loop incidence matrix C.

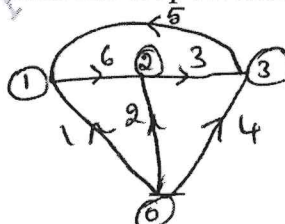
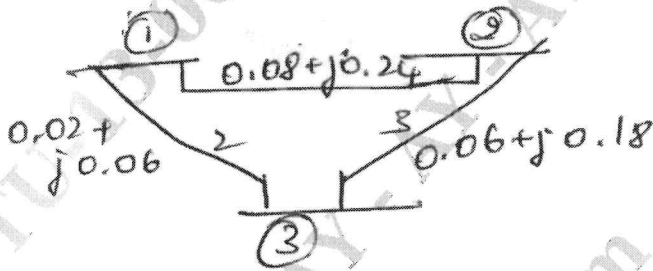


Fig. Q2 (b)

	c.	Derive an expression for bus admittance matrix (Y_{Bus}) using singular transformation method.	8	L2	CO1
Module – 2					
Q.3	a.	Explain with suitable algorithmic steps involved in, Gauss-Seidal iterative method for load flow solution (GSLF) method.	6	L2	CO2
	b.	Explain the importance of load flow studies in power system analysis.	6	L2	CO2
	c.	Derive the static load flow equations (SLFE) (in polar form).	8	L2	CO2
OR					
Q.4	a.	For the power system shown in Fig. Q4 (a) all buses except slack bus are PQ buses. Calculate the voltages at the end of 1 st iteration using Gauss Seidal Load Flow (GSLF) method.	10	L3	CO2
Fig. Q4 (a)					
	b.	What are the constraints to be considered for a load flow solution?	5	L2	CO2
	c.	Classify the Buses in power system for conduction of load flow solution.	5	L2	CO2
Module – 3					
Q.5	a.	A sample 3 Bus system has slack bus, PQ Bus, PV Bus (one each). Write the structural form power system Jacobian matrix (J) with necessary equations to calculate its elements.	10	L2	CO3
	b.	Explain with a flowchart Newton Raphson Load Flow (NRLF) method to solve load flow problem (Polarform).	10	L2	CO3
OR					
Q.6	a.	Explain in brief the important assumption made in arriving at Fast Decoupled Load Flow method (FDLF) from NRLF method.	10	L2	CO3
	b.	Explain with a flow chart FDLF method (in polar form).	10	L2	CO3
Module – 4					
Q.7	a.	A power plant consisting of two units $IC_1 = 40 + 0.2p_1$ and $IC_2 = 30 + 0.25p_2$. Find the total yearly saving in fuel cost in rupees for optimal scheduling of a load of 130 MW as compared to equal distribution of same load between them.	8	L3	CO4
	b.	Write a brief note on the performance curves of a thermal power station for economic load dispatch neglected.	6	L2	CO4

	c.	Derive the expression for economic dispatch with transmission load dispatch studies.	6	L2	CO4
OR					
Q.8	a.	Derive an expression for condition for economic load dispatch including transmission loss (B-coefficients).	8	L2	CO4
	b.	Explain the algorithm steps in dynamic programming approach to solve unit commitment problem.	8	L2	CO4
	c.	What is unit commitment? What are the constraints to be considered in unit commitment? Explain in brief.	4	L1	CO4
Module – 5					
Q.9	a.	Consider the system in Fig.Q9 (a), obtain Z_{Bus} by using Building algorithm.	10	L3	CO5
		 Fig. Q9 (a)			
	b.	Explain with necessary equations the Z_{Bus} formulation under the following modification - Type – 1, Type – 2, Type – 3, Type – 4 (without mutual coupling)	10	L2	CO5
OR					
Q.10	a.	Write an explanatory note on methods employed for numerical solution of swing equation : (i) Runge Kutta method (ii) Point by Point method.	10	L2	CO5
	b.	Derive the swing equation for conducting power system stability studies.	10	L2	CO5
