CLASS: BTECH   SEMESTER: VII
BRANCH: EEE   SESSION: MO/2024

SUBJECT: EE441 COMPUTER-AIDED POWER SYSTEM ANALYSIS
TIME: 02 Hours   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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			CO	BL
Q.1(a)	Define load flow analysis and its significance in power system operation.	[2]	CO3	1
Q.1(b)	Describe the role of computer-aided tools in power system analysis. How do these tools improve the efficiency and accuracy of power system studies?	[3]	CO1	1
Q.2(a)	Given a power system with a transmission line, describe how you would model the line's impedance in a single-phase system.	[2]	CO3, CO4	1,2
Q.2(b)	For a 15-bus power system with 3 voltage-controlled buses, find the size of the Jacobian matrix.	[3]	CO2	2
Q.3(a)	Explain how a slack bus is represented in a power system model and why it is essential for load flow studies.	[2]	CO2	1
Q.3(b)	A 10-bus power system consists of 4 generator buses indexed as G1, G2, G4 and 6 load buses indexed as L1, L2, L3, L4, L5 and L6. The generator bus G1 is considered as slack bus and load buses L3 and L4 are voltage controlled buses. The generator at bus G2 cannot supply the required reactive power demand and hence it is operating at its maximum reactive power limit. Find the number of non-linear equations required for solving the load flow problem using the Newton-Raphson method in polar form.	[3]	CO3, CO4	1,2
Q.4(a)	Explain the concept of off-nominal tap settings in transformers.	[2]	CO1	1
Q.4(b)	Compare Gauss-Seidel, Newton-Raphson, and Fast Decouple load flow methods based on the following criteria: (i) Number of iterations (ii) Time taken for 1 iteration (iii) Convergence	[3]	CO3, CO4	1,2
Q.5(a)	Explain how different types of loads (e.g., constant power, constant current, constant impedance) are modelled in power system analysis.	[2]	CO5	2
Q.5(b)	Explain the process of solving load flow problems using the Newton-Raphson method.	[3]	CO4	2

::::::18/09/2024::::::M