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

SUBJECT: EE441 COMPUTER AIDED POWER SYSTEM ANALYSIS

TIME: 3 Hours   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL

Q.1(a)   Explain the modeling process of a basic single-phase AC system and illustrate how each   [5]   CO2   BL2
         component (generator, transmission line, and transformer) is represented in this model.
Q.1(b)   Explain the economic dispatch problem in power systems.   [5]   CO4   BL2

Q.2(a)   Explain the flow chart for NR method without PV buses.   [5]   CO3   BL4
Q.2(b)   A three-phase system with a line-to-line voltage of 11 kV experiences a balanced three-   [5]   CO5   BL3
         phase fault at the bus. If the equivalent impedance of the system up to the fault
         location is Z_{eq} = 0.2 + j0.8 Ω, calculate the fault current.

Q.3(a)   Discuss the priority-list method used in unit commitment, and explain its advantages   [5]   CO4   BL4
         and limitations compared to the dynamic programming approach.
Q.3(b)   A synchronous generator operates at steady-state power angle of 30°, with an output   [5]   CO4   BL3
         power of 0.8 p.u. A sudden 3-phase fault occurs; reducing the power output to 0. After
         the fault is cleared, generator power output increases to 1.1 p.u at power angle of 60°.
         Using the concept of equal area criterion, find the maximum swing angle that system
         will reach, if it remains stable after the fault.

Q.4(a)   A three bus power systems is shown below: Determine the voltages at buses 2 and 3   [5]   CO3   BL3
         after 1st iteration using Gauss-Seidel method. Take the acceleration factor α=1.6.

Bus No.	Type	Generation		Load		Bus Voltage	
		P_G	Q_G	P_L	Q_L	V	δ
1	Slack	-	-	-	-	1.02	0
2	PQ	0.25	0.15	0.5	0.25	-	-
3	PQ	0	0	0.6	0.3	-	-
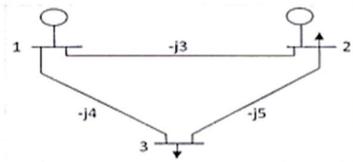
Q.4(b)   Explain the symmetrical components method and its application in analyzing three-   [5]   CO3   BL2
         phase fault currents in power systems.

Q.5(a)   Define power system stability and explain its types of stability concerns in a power   [5]   CO1   BL1
         system.
Q.5(b)   Describe the modeling approach for off-nominal and phase-shifting transformers in   [5]   CO3   BL3
         transmission lines. How do these components affect power flow in the system?