R22 Regulation *Subject code: 4E6BB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Regular Examinations, May 2025

POWER SYSTEM OPERATION AND CONTROL

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Maximum Marks: 60 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

	Part-A	Marks	CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)				
1.a)	What is the need for load flow studies?	1	CO1	BT1
b)	List the advantages of fast decoupled method.	1	CO1	BT1
c)	State swing equation.	1	CO2	BT1
d)	What is critical clearing angle?	1	CO2	BT1
e)	Why frequency of the power system should be kept constant?	1	CO3	BT2
f)	Write the importance of load frequency control.	1	CO3	BT1
g)	What are the sources of reactive power? How it is controlled?	1	CO4	BT2
h)	State the effects of capacitors in series compensation circuit.	1	CO4	BT1
i)	Write any two functions of computer system in power system..	1	CO5	BT1
j)	Give out the functions of SCADA.	1	CO5	BT1
	Part-B			
Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Write about differences between Gauss-Seidel and Newton Raphson methods. b) Derive the bus admittance matrix.	5+5	CO1	BT2
	OR			
3	Present the algorithm for load flow solution for Gauss-Seidel method with PQ buses presents.	10	CO1	BT3
4	a) Discuss the equal area criterion applied to a Generator connected to infinite bus through a line, when fault cleared after some time. b) Derive the swing equation.	5+5	CO2	BT4
	OR			
5	a) Discuss the various methods of improving steady state and transient state stability. b) Explain the Factors affecting the Transient stability.	5+5	CO2	BT3
6	Draw the block diagram representation of a single area isolated power system and deduce the expression for the steady state response of the system.	10	CO3	BT4

	OR			
7	Explain the proportional plus integral control for load frequency control of single area system.	10	CO3	BT2
8	a)A load of (15+j10) MVA is supplied with a power from generating station from a line at 110kV, 3-ϕ, 50 Hz. The length of the line is 100 km. The line is represented by π-model with the parameters R=26.4 ohms X=33.9 ohms B=219×10^{-6} ohms The voltage at the generating end is 116 kV. Determine the power supplied by the generating station. b) Discuss about un-compensated system of transmission line.	5+5	CO4	BT4
	OR			
9	a) What are the advantages and disadvantages of different types of compensating equipment for transmission systems? b) Distinguish shunt and series compensations.	5+5	CO4	BT4
10	Discuss the various functions, system monitoring of EMS.	10	CO5	BT3
	OR			
11	a) Write short notes on state estimation. b) Write applications of SCADA system.	5+5	CO5	BT2