



R22 Regulation

Subject code:4E6BB

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

**B.Tech VI Semester Supplementary Examinations, November 2025**

## POWER SYSTEM OPERATION AND CONTROL

(EEE)

Maximum Marks: 60

Date: 21.11.2025

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

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Define Acceleration factor.	1M	1	1
b)	What is the necessity of load flow studies?	1M	1	2
c)	Define Transient Stability of a power system network.	1M	2	1
d)	List out the methods to improve Steady state Stability.	1M	2	2
e)	What are the components of a single area load frequency control system?	1M	3	1
f)	What is the necessity of keeping frequency constant in a power system?	1M	3	2
g)	What is the necessity of reactive power control?	1M	4	2
h)	List the specifications of load compensator.	1M	4	2
i)	List out the functions of EMS Systems.	1M	5	1
j)	Define state estimation.	1M	5	2

### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Explain Gauss-Seidel method algorithm with including both PQ and PV buses.	10M	1	2
OR				
3	Explain Newton-Raphson Algorithm with Rectangular Coordinates.	10M	1	2
4	Derive the condition for determining steady state stability of a power system network.	10M	2	3
OR				
5	Explain Equal Area Criteria with neat diagram.	10M	2	3
6	Discuss in detail the block diagram representation of a single area isolated power system and analyze its dynamic and steady state response under uncontrolled conditions.	10M	3	3
OR				
7	Explain the integration of Load Frequency Control (LFC) with Economic Dispatch Control. Why is this integration important in modern power systems?	10M	3	2

8	Explain the different types of Reactive Power Compensation in Transmission Systems	10M	4	2
	OR			
9	Identify the merits and demerits of different types of compensation equipment for transmission systems	10M	4	2
10	Illustrate what is the need of computer control in power system.	10M	5	2
	OR			
11	With a neat diagram explain the hardware components of a SCADA System and explain the application of SCADA in monitoring and control of Power System.	10M	5	4