

Enrollment No./ Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

MASTER OF ENGINEERING - SEMESTER - 1 EXAMINATION – SUMMER 2026

Subject Code: 3710711

Date: 09-06-2026

Subject Name: Power System Analysis

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

- Q.1** (a) Explain Gauss-Seidel method for power flow analysis. **07**
(b) Explain handling of $Q_{\max}$ violations in constant matrix while using load flow Solution. **07**
- Q.2** (a) Draw the flow chart for Newton-Raphson method for 'n' bus power system having both PV and PQ buses. **07**
(b) Explain symmetrical fault analysis using bus impedance matrix with necessary algorithm. **07**
- OR**
- (b) Draw security state block diagram and explain each state in detail. **07**
- Q.3** (a) Explain Maximum Likelihood Weighted Least Squares Estimation. **07**
(b) Explain the following: (1) Voltage Instability (2) Voltage Collapse **07**
- OR**
- Q.3** (a) Explain performance index (PI). How it is useful for contingency selection? **07**
(b) Explain REI method of Power System network reduction (Equivalence). **07**
- Q.4** (a) Explain the following with respect to power system security (1) Generation shift factor (2) Line outage distribution factor **07**
(b) Draw and discuss the flow chart of contingency analysis procedure **07**
- OR**
- Q.4** (a) Write a brief note on concentric relaxation and bounding. **07**
(b) What is open conductor fault? Derive fault current equation for one open conductor condition. **07**
- Q.5** (a) Explain: WARD equivalents **07**
(b) Explain Sparsity technique. Discuss any one method to store sparse matrix in computer. **07**
- OR**
- Q.5** (a) Explain the various methods of improving the voltage stability and its practical aspects. **07**
(b) Explain the procedure for bad data detection in relation to state estimation. **07**
