

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3160920

Date: 01/06/2026

Subject Name: Inter Connected Power System

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a) Define steady-state, transient, and dynamic stability in power systems. **03**
 - (b) What is meant by interconnected power systems? Discuss its advantages and operational benefits. **04**
 - (c) Explain different methods of voltage control in power systems and analyze their effectiveness. **07**
- Q.2**
- (a) Explain the classification of buses in load flow analysis. State the role of slack bus. **03**
 - (b) Explain cascade tripping in power systems and its effects. **04**
 - (c) Describe the Fast Decoupled Load Flow (FDLF) method. **07**
- OR
- Q.2**
- (c) Evaluate the factors affecting transient stability and propose measures to improve it. **07**
- Q.3**
- (a) Compare Gauss–Seidel and Newton–Raphson methods for load flow studies **03**
 - (b) Explain the formation of bus incidence matrix and primitive network with examples. **04**
 - (c) Derive Y_{bus} matrix using the singular transformation method. **07**
- OR
- Q.3**
- (a) Define islanding and explain its importance in system reliability. **03**
 - (b) What is unit commitment? Explain its significance in power system operation. **04**
 - (c) Analyze the steps involved in Newton–Raphson method for solving load flow equations. **07**
- Q.4**
- (a) Explain the concept of penalty factor in economic load dispatch. **03**
 - (b) Derive the expression for transmission loss formula. **04**
 - (c) Discuss the numerical solution of swing equation for transient stability analysis. **07**
- OR
- Q.4**
- (a) Define unit commitment and describe the dynamic programming approach to solve it. **03**
 - (b) Discuss methods to improve steady-state stability in power systems. **04**
 - (c) Evaluate equal-area criterion of stability using a neat diagram. **07**
- Q.5**
- (a) Define the term "load flow problem" and write the static load flow equations. **03**
 - (b) Explain turbine speed governing system with neat diagram. **04**

- (c) Analyze different methods of load frequency control and explain tie-line load bias control. **07**

OR

- Q.5** (a) Explain generator operating cost and factors influencing it. **03**
(b) Explain selective frequency control and flat frequency control methods **04**
(c) Evaluate the stability of a single machine–infinite bus system using the equal area criterion. **07**
