

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII EXAMINATION – SUMMER 2025

**Subject Code:2170901**

**Date:23-05-2025**

**Subject Name: Interconnected Power System**

**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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1 (a)** What is power system islanding? Why it is needed? What is ideal procedure to restore the grid? Discuss the effects of islanding. **07**
- (b)** Write a short note on Load Dispatch Centre. **07**
- Q.2 (a)** Derive static load flow equations. **07**
- (b)** Explain the classification of buses. What is the significance of slack bus? Why slack bus related quantity does not enter into Jacobean Matrix? **07**
- OR**
- (b)** In the equation  $YBUS = ATYA$ , what are matrices Y and A? Also mention their dimensions. **07**
- Q.3 (a)** Compare GS and NR method of load flow **07**
- (b)** Discuss the algorithm of load flow solution using Newton-Raphson method for all type of buses. **07**
- OR**
- Q.3 (a)** Explain GS method with the help of flowchart **07**
- (b)** Give the algorithm with flow chart for a fast decoupled load flow solution **07**
- Q.4 (a)** Distinguish between steady state, dynamic and transient stability **07**
- (b)** Discuss dynamics of synchronous machine and derive the swing equation **07**
- OR**
- Q.4 (a)** Explain point by point method of stability. State the assumptions made **07**
- (b)** How can the transient stability of a system be improved **07**
- Q.5 (a)** Write short note on unit commitment. **07**
- (b)** Explain equal area criteria of stability **07**
- OR**
- Q.5 (a)** Prove that  $M d^2\delta/dt^2 = P_m - P_e$ ,  $P_m$  is mechanical power,  $P_e$  is electromagnetic power and M is angular momentum **07**
- (b)** What is synchronizing coefficient? Prove that synchronizing coefficient of a machine should be positive for system stability **07**

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