Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 7 – EXAMINATION – SUMMER 2026

Subject Code: 2170901 **Date: 05/06/2026**

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)**	Describe the advantages of interconnections of power systems in details.	**03**
	(b)	What is Power system Islanding? Discuss the effect of Islanding.	**04**
	(c)	Explain methods used for voltage control in power systems.	**07**
Q.2	**(a)**	Define terms : (a) Graph (b) tree (c) co-tree	**03**
	(b)	Explain power system restoration after cascade tripping.	**04**
	(c)	Discuss Z_{BUS} building algorithm. Explain all types of modifications when transmission lines are added between buses.	**07**
		OR	
	(c)	A three Bus, three line systems is shown in Figure-1, each line has as series impedance of (0.05+j0.15) p.u., and the shunt admittance is neglected. Find Y_{BUS}.	**07**

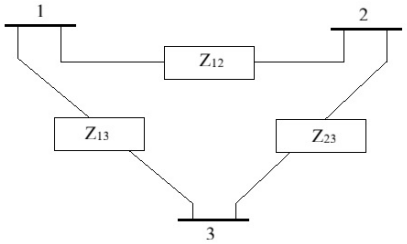

Figure-1

Q.3	**(a)**	State the assumptions made for load flow studies.	**03**
	(b)	By using Gauss-Seidel method determine the voltages V_1 and V_2 of following set of linear equations: $10V_1+2V_2 = 10$; $4V_1+7V_2 = 15$	**04**
	(c)	Compare Newton-Raphson method with Gauss-Seidal method.	**07**
		OR	
Q.3	**(a)**	Derive static load flow equations.	**03**
	(b)	What is the importance of slack bus in power system?	**04**
	(c)	Give the algorithm with flow chart for a fast decoupled load flow solution.	**07**
Q.4	**(a)**	Define penalty factor.	**03**
	(b)	Define power system stability and give its classification.	**04**
	(c)	Write short note on unit commitment.	**07**
		OR	

Q.4 **(a)** Draw Heat rate curve and Incremental rate curve with appropriate notation. **03**

(b) List out methods to improve transient stability of the power system. **04**

(c) Determine transmission loss formula using Kron's method. **07**

Q.5 **(a)** Discuss the factors affecting steady transient stability. **03**

(b) Discuss transient stability conditions using equal area criteria. **04**

(c) A 100 MVA, 2 pole, 60 Hz generator has a moment of inertia 50×10^3 Kg.m^3 **07**
(1) What is energy stored in the rotor at rated speed?
(2) What is corresponding angular momentum?
(3) Determine the inertia H.
(4) If the input to generator is suddenly increased by 25 MW, determine the rotor acceleration.

OR

Q.5 **(a)** Discuss the factors affecting steady state stability. **03**

(b) Why steady state limit is higher than transient stability limit? **04**

(c) Discuss the dynamics of synchronous machine and hence derive the swing equation. Also write stability condition from swing curve. **07**

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