

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024

Subject Code: 2170901**Date: 30-05-2024****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.

MARKS

Q.1* (a) What is load flow study and which are the important outcomes of this study? **03**

(b) What is Islanding in power system? Explain the significance of it. **04**

(c) Determine Zbus from below given data **07**

From Bus	To bus	Impedance
0	1	1Ω
0	2	3Ω
2	3	5Ω

Q.2 (a) Derive the static load flow equations for three bus power system **03**

(b) Discuss classification of bus for load flow study. **04**

(c) Compare Newton-Raphson method with Gauss-Seidal method **07**

OR

(c) Discuss Fast de-coupled load flow method **07**

Q.3 (a) Discuss economic operation of the generators within thermal plant. **03**

(b) Discuss penalty factor. **04**

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

OR

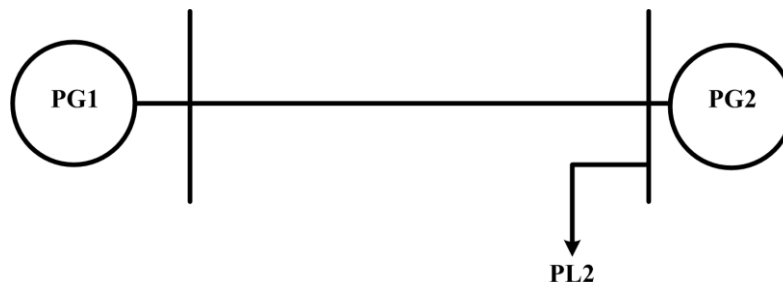
Q.3 (a) Discuss generator operating cost. **03**

(b) Discuss security constrained unit commitment. **04**

(c) In two bus system power system, 80 MW is transferred from plant-1 to plant-2. In this case, 8 MW loss is occurred. Find the power generation for each plant and power transmitted to load considering $\lambda=12.5$

$$dC_1/dPG_1=0.01 PG_1+8 \text{ Rs./MWh}$$

$$dC_2/dPG_2=0.02 PG_2+10 \text{ Rs./MWh}$$



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| Q.4 | (a) | List out the factors affecting on steady state stability. | 03 |
| | (b) | List out the information provided by equal area criteria method. | 04 |
| | (c) | Discuss the modeling of turbine speed governing mechanism. | 07 |
| OR | | | |
| Q.4 | (a) | Define power system stability and give its classification. | 03 |
| | (b) | Discuss swing curves. | 04 |
| | (c) | What is flat frequency control. Discuss tie line frequency control. | 07 |
| Q.5 | (a) | List out the assumptions to be made during the study of transient stability. | 03 |
| | (b) | List out four methods to improve transient stability of the power system. | 04 |
| | (c) | Discuss the swing equation | 07 |
| OR | | | |
| Q.5 | (a) | Define transient and dynamic stability of the power system | 03 |
| | (b) | Comparative evaluation between steady state stability and transient stability. | 04 |
| | (c) | A two pole, 50 Hz, 100 MVA turbo generator has a moment of inertia of 6000 kg-m ² . Determine (i) The kinetic energy at rated speed, (ii) Inertia constants M & H, and (iii) Inertia constants at 50 MVA base. | 07 |
