

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019

Subject Code: 2170901
Date: 28/11/2019
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.

		MARKS
Q.1	(a) What is the concept of Islanding? State its important advantages.	03
	(b) Explain different types of buses in Power System.	04
	(c) Form Y_{BUS} for a given power system shown in figure 1.	07
Q.2	(a) What is a static load flow analysis? Write the equations of real and reactive power injected at i^{th} bus in a general power system.	03
	(b) Give difference between the steady state and transient state stability of power system.	04
	(c) Give comparison between Gauss –Seidel and Newton- Raphson method for load flow solution.	07
OR		
	(c) Write the relationship between the element voltages and bus voltages for a given power system shown in figure 2. Also obtain its bus incidence matrix.	07
Q.3	(a) When penalty factor is to be considered for optimum generation scheduling?	03
	(b) Explain cascading tripping.	04
	(c) A two bus system is shown in figure 3. If 100MW power is transferred from plant 1 to the load; a transmission loss of 10MW is incurred. Find the loss in transmission line. The system λ is Rs. 25/MWh. The incremental fuel costs of the plants are given below:	07
	$\frac{dC_1}{dP_1} = 0.02P_1 + 16 \text{ Rs/MWh}$ $\frac{dC_2}{dP_2} = 0.04P_2 + 20 \text{ Rs/MWh}$	
OR		
Q.3	(a) State the advantages of interconnection in power system.	03
	(b) Draw and explain the incremental fuel cost versus power output characteristics of the generating unit in power plant.	04
	(c) Derive the transmission loss formula for a two power plants system connected with a transmission line.	07
Q.4	(a) Explain the importance of voltage control in power system.	03
	(b) Explain power generation scenario in Gujarat from fuel used in power generation point of view.	04
	(c) A 100MVA, synchronous generator operates on full load at a frequency of 50Hz. The load is suddenly reduced to 50 MW. Due to time lag in governor system, the steam valve begins to close after 0.4 seconds. Determine the change in frequency that occurs in this time. Take $H = 5 \text{ KW-sec/KVA}$.	07
OR		
Q.4	(a) Explain the importance of frequency control in power system.	03

- (b) Give difference between the flat frequency control and selective frequency control. 04
- (c) Explain methods of voltage control for power system. 07
- Q.5** (a) Explain the role of automatic voltage regulator in generator. 03
- (b) Draw and explain simplified transient generator model. 04
- (c) A 100 MVA, 11KV, 50 Hz four pole turbo generator is rotating at synchronous speed. Energy is stored in its rotor equal to 800 MJ. Find the inertia constant of the generator. Also determine the rotor acceleration, if the mechanical input is suddenly raised to 80 MW for an electrical load of 50 MW. Neglect mechanical and electrical losses. 07
- OR**
- Q.5** (a) State three assumptions made in solving the swing equation. 03
- (b) Explain equal area criteria for sudden increase in mechanical input to generator. 04
- (c) Determine the operating power angle for a power system shown in figure 4. The generator is delivering 1.0 pu power to the infinite bus. All reactance are in pu 07

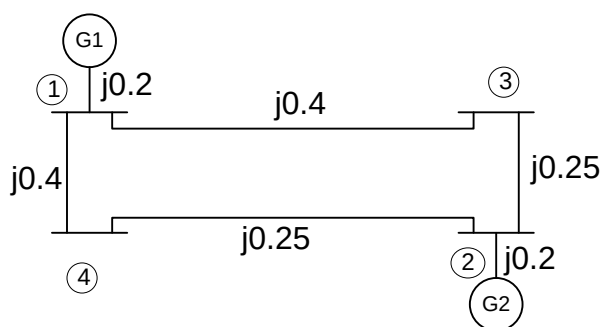


Figure 1

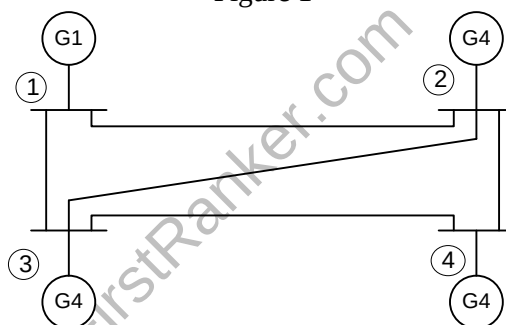


Figure 2

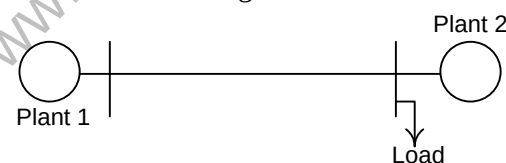


Figure 3

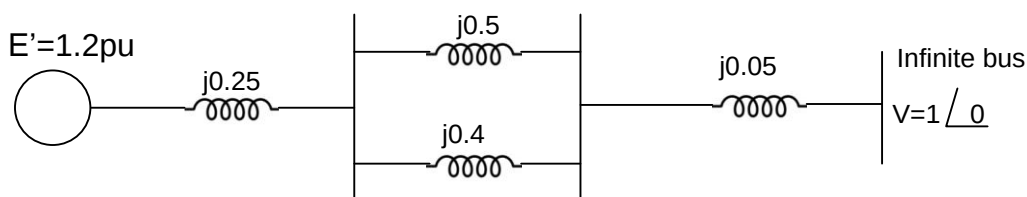


Figure 4
