GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2170901   **Date:16/05/2019**
Subject Name:Inter Connected 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.

			MARKS
Q.1	**(a)**	What is power system stability? Classify power system stability.	**03**
	(b)	How the buses in power systems are classified?	**04**
	(c)	Explain need of load flow analysis, Derive static load flow equations.	**07**
Q.2	**(a)**	When the generator bus is treated as load bus?	**03**
	(b)	Discuss various methods to improve steady state stability.	**04**
	(c)	The following figure shows a simple 4-bus system.	**07**
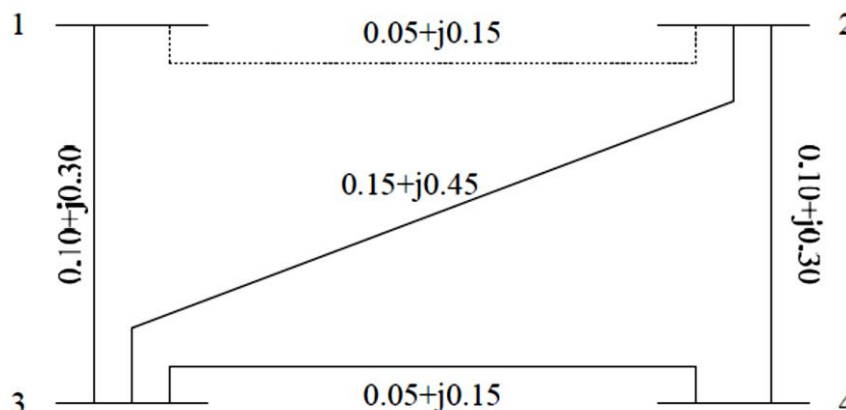
Line	G,pu	B,pu
1-2	2.0	-6.0
1-3	1.0	-3.0
2-3	0.66	-2.0
2-4	1.0	-3.0
3-4	2.0	-6.0

The shunt admittances at all the buses are assumed negligible.
1) Find YBUS assuming that the line shown dotted is not connected.
2) What modifications need to be carried out in YBUS if the line shown dotted is connected?

OR

(c) A synchronous generator of reactance 1.2 pu is connected to an infinite bus bar ($|V|=1.0$ pu) through transformer and a line of total reactance of 0.5 pu. The generator no load voltage is 1.2 pu and its inertia constant is H=5 MW–s/MVA. The resistance and machine damping may be assumed negligible. The system frequency is 50 Hz. Calculate the frequency of natural oscillations if the generator is loaded to (i) 60% and (ii) 75% of its maximum power limit.   **07**

1

Q.3 **(a)** Explain Incremental fuel cost and penalty factor with its equation **03**

(b) Explain automatic load dispatch in power system also explain the importance of regional load dispatch center. **04**

(c) The incremental fuel costs for two units of a plant are given by **07**

$$\lambda = \frac{df_1}{dP_{g1}} = 0.012P_{g1} + 8 \quad \text{and} \quad \lambda = \frac{df_2}{dP_{g2}} = 0.002P_{g1} + 9.6$$

Assuming both units are operating at all times, that total load varies from 200 to1150 MW, and that maximum and minimum loads on each unit are to be 550 and 100 MW, respectively. Find the incremental fuel cost of the plant and the allocation of load between units for the minimum cost of various total loads.

OR

Q.3 **(a)** Why bus admittance matrix is used in Gauss Seidal instead of bus impedance matrix. **03**

(b) Explain speed governing mechanism for frequency control. **04**

(c) Explain various techniques to improve transient stability of a power system. **07**

Q.4 **(a)** Explain point by point method of stability in brief. **03**

(b) Compare GS method of load flow study with FDLF method. **04**

(c) Explain the step by step method of solving swing equation stating clearly the assumptions. **07**

OR

Q.4 **(a)** Explain equal area criterion of stability. **03**

(b) What is Multimachine stability? List the assumptions made in multimachine stability studies. **04**

(c) For the system shown in figure, find the voltage at the receiving bus at the end of the first iteration by GS Method. Load is 2 + 70.8 pu. voltage at the sending end (slack) is 1 + j0 pu. Line admittance is 1.0 - j4.0 pu. Transformer reactance is j0.4 pu. Off nominal turns ratio is 1/l.04. **07**
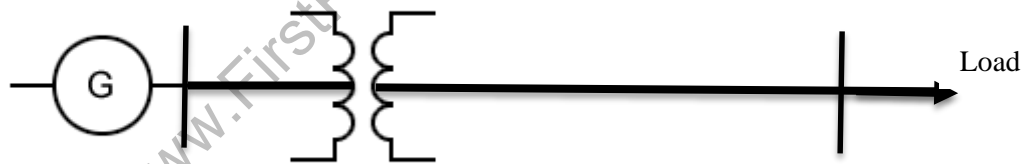
Q.5 **(a)** Explain cascade tripping in power system. **03**

(b) Explain network islanding phenomenon. **04**

(c) Derive equation for B-coefficient **07**

OR

Q.5 **(a)** What are the assumptions made in solving swing equation? **03**

(b) Explain fully selective frequency control methods used for controlling frequency in single/two area power system. **04**

(c) Explain methods used for voltage control in power systems. **07**

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