

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) - EXAMINATION – SUMMER 2017****Subject Code: 2170901****Date: 04/05/2017****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.

- Q.1 (a)** List the advantages and disadvantages of Inter connected power systems. **07**
- (b)** Explain cascade tripping and network islanding phenomenon in brief. **07**
- Q.2 (a)** Derive static load flow equations. Hence explain classification of buses. **07**
- (b)** The Z_{BUS} matrix for a certain system is given by **07**

$$Z_{BUS} = \begin{bmatrix} 0.4054 & 0.1622 & 0.3243 \\ 0.1622 & 0.3649 & 0.2297 \\ 0.3243 & 0.2297 & 0.4595 \end{bmatrix}$$

Find the modified bus impedance matrix if the line from bus 1 to bus 3 is removed. Assume that impedance of line between bus 1 and bus 3 is 0.25 ohm.

OR

- (b)** Figure 4 shows the one-line diagram of a simple four-bus system. Table 1 gives the line impedances identified by the buses on which these terminate. The shunt admittance at all the buses is assumed negligible. **07**
- (a)** Find Y_{BUS} assuming that the line shown dotted is not connected.
- (b)** What modifications need to be carried out in Y_{BUS} if the line shown dotted is connected?

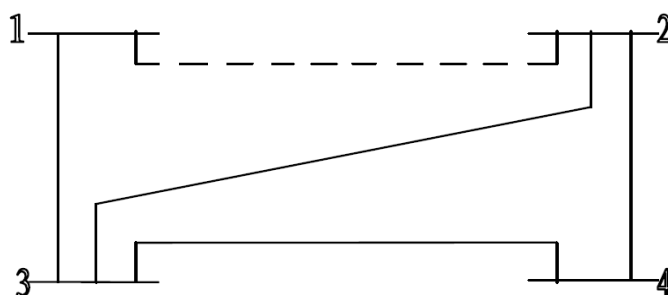


Figure - 1

Line, bus to bus	R,pu	X,pu
1-2	0.05	0.15
1-3	0.10	0.30
2-3	0.15	0.45
2-4	0.10	0.30
3-4	0.05	0.15

Table - 1

- Q.3 (a)** State the assumptions made for load flow studies and applications of load flow studies. **07**

	(b)	Compare NR method with GS method of load flow study.	07
		OR	
Q.3	(a)	Explain automatic load dispatch in power system also explain the importance of regional load dispatch center.	07
	(b)	The fuel cost of two unit plants are given by $C_1 = 100 + 2P_1 + 0.005 P_1^2$ $C_2 = 200 + 2P_2 + 0.01 P_2^2$ where P_1 and P_2 in MW. The plant supplies a load of 450 MW. Find economic load scheduling of two unit and find incremental fuel cost, neglecting losses.	07
Q.4	(a)	Describe flat frequency control and selective frequency control used for controlling frequency in power system.	07
	(b)	Explain tie-line load bias method of frequency control.	07
		OR	
Q.4	(a)	Describe the methods of voltage control adopted for large size power system in detail.	07
	(b)	Explain point by point method of stability in detail.	
Q.5	(a)	Discuss the dynamics of synchronous machine and hence derive the swing equation.	07
	(b)	A 100 MVA, 2 pole, 60 Hz generator has a moment of inertia $50 \times 10^3 \text{ kg.m}^2$. (a) What is energy stored in the rotor at rated speed? (b) What is the corresponding angular momentum? (c) Determine the inertia constant H. (d) If the input to the generator is suddenly increased by 25 MW, determine the rotor acceleration.	07
		OR	
Q.5	(a)	Describe the traditional technique and new approaches for improvement of transient stability limit of a power system.	07
	(b)	(1) Define following : (i) Steady-state stability (ii) Transient stability	04
		(2) Discuss: Why transient stability limit is lower than steady state stability limit?	03
