

Q.P. Code : 29759

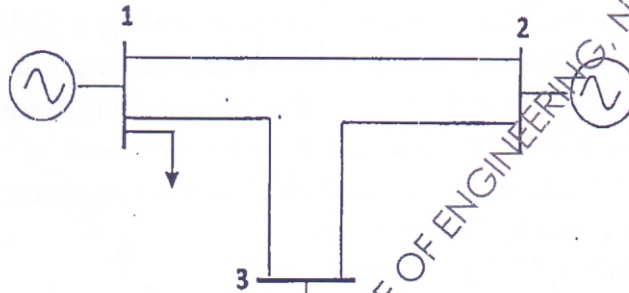
(3 Hours)

[ Total Marks : 100

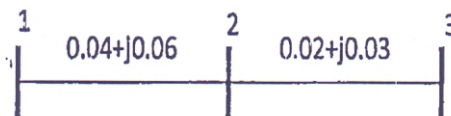
- N.B. : (1) Question no 1 is compulsory.  
 (2) Answer any four question from the remaining five questions.

1. Answer the following

- (a) One line diagram of a three bus system is shown below. Series impedance of the line is  $j0.2$  pu. Neglect series resistance and shunt admittance. Calculate  $Y_{Bus}$ .



- (b) Explain different types of buses in load flow analysis  
 (c) What are the significance of load frequency control?  
 (d) Write down the expression for FDLF analysis and explain
2. (a) For the network shown in the figure, obtain the complex bus bar voltage at bus 2 at the end of first iteration. Use G.S method. Line impedances shown in figure below are in p.u. Given: 10

Bus 1 is slack bus with  $V_1 = 1 + j0$ :Complex power at Bus 2 is  $S_2 = -5.96 + j1.46$ .Magnitude of Bus 3 voltage is  $|v_3| = 1.02$ Assume:  $V_3^0 = 1.02 + j0$  and  $V_2^0 = 1 + j0$ 

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- (b) Explain different stability analysis and equal area criterion for transient stability analysis 10
3. (a) Develop block diagram representation of load frequency control with primary ALFC loop of an isolated power system 10  
(b) Plot the dynamic response of load frequency controller with and without integral controller and explain. 10
4. (a) Prove that for economic load dispatch the product of incremental cost and penalty factor of each generating unit should be the same. 10  
(b) A system consists of two plants connected by a tie line and a load is located at plant 2. When 100MW are transmitted from plant 1, a loss of 10MW takes place on the tie line. Determine the generation schedule at both the plants and power received by the load when  $\lambda$  for the system is Rs. 25 per MWhr and the incremental fuel costs (IC) are given by the equation:  
 $IC_1 = 0.03P_1 + 17 \text{ Rs./MWhr}$   
 $IC_2 = 0.06P_2 + 19 \text{ Rs./MWhr}$  10
5. (a) Write down the classification of power system states 10  
(b) Derive the expression for the transmission loss using B- coefficients. 10
6. Write short note on any two 20  
(i) cost and incremental cost curve of a generating unit  
(ii) Newton Raphson Load Flow analysis  
(iii) Power system security
7. (a) Explain the contingency analysis in power system 10  
(b) Discuss the concept of power pool in detail. 10