(12) BE- Sem- VII - CBSGS - Electrical - PSOC

15/5/17

Q.P. Code :628002

3 Hours Total Marks:- **80**

Note
Question No. **1** is compulsory.
Solve any **THREE** questions out of remaining.
Assume suitable data if required and mention the same.

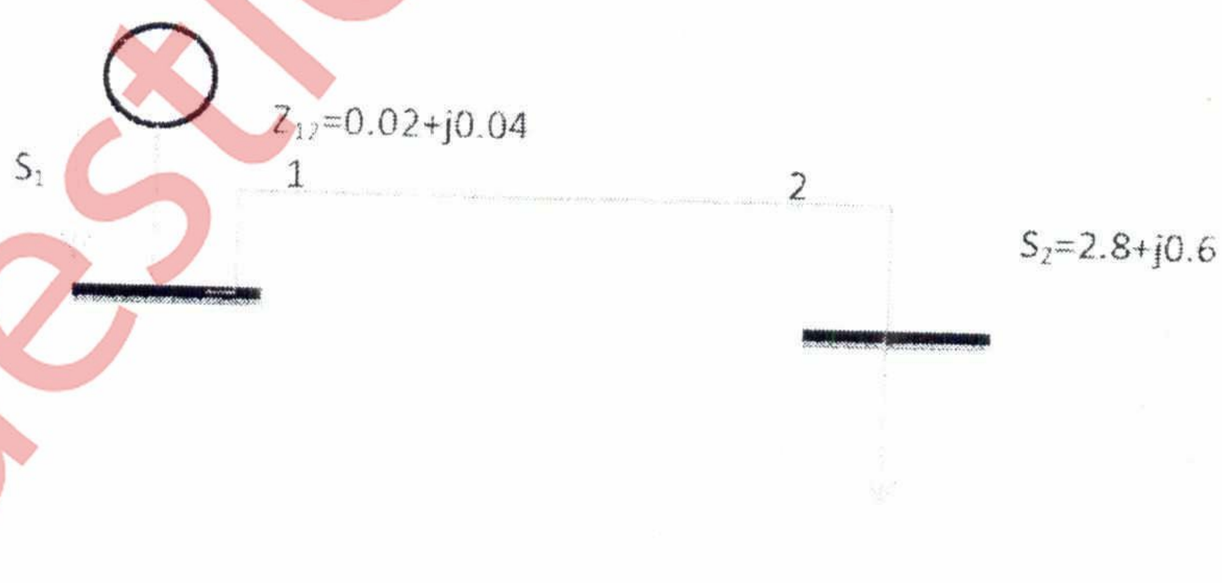
Q.1 Answer the following questions **20**
a) What are the assumptions made in FDLF?
b) Discuss the control area concept.
c) Write down the condition for Economic Load dispatch by neglecting transmission losses.
d) What is the significance of equal area criterion?

Q.2 a) Explain the dynamic response of an isolated area. How does the PI controller help to make steady state frequency of the isolated area constant for the load frequency control? **10**

b) Two generators rated 200 MW and 400 MW are operating in parallel. The droop characteristics of their governors are 3% and 4 % respectively from no load to full load. Assuming those generators are operating at 50 Hz at no load, how a load of 600MW would be shared between the two units. What will be the system frequency at this load? If load is now suddenly reduced to 400 MW what will be the new system frequency and load shared by each generator. Assume free governor operation. **10**

Q.3 a) Discuss the Newton-Raphson method for load flow study **10**

b) In two bus system shown, bus 1 is a slack bus with $V_1 = 1.0\angle 0^o$ pu and bus 2 is load bus with $S_2 = 2.8 + j0.6$ pu. The line impedance is $Z = 0.02 + j0.04$ pu **10**
a) Using Gauss Seidel method, determine V_2. Perform one iteration.
b) Determine S_1, reactive and real power loss in the line.



Q.4 a) Explain Swing equation which describes the rotor dynamics for a synchronous machine. **10**

b) A 50 Hz, 4 pole turbogenerator rated 100MVA, 11 KV has an inertia constant of 8MJ/MVA. **10**
i) Find stored kinetic energy in the rotor at synchronous speed
ii) If the mechanical input is suddenly raised to 90MW for an electrical load of 45MW, find rotor acceleration, neglecting mechanical and electrical losses
iii) What will happen in case B if mechanical input is less than the electrical load?

Q.5 a) Derive the expression for the exact co-ordination equation. 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 λ for the system is Rs. 25 per MWhr and the incremental fuel costs (IC) are given by the equation, 10

$IC_1 = 0.03P_1 + 17$ Rs/MWhr

$IC_2 = 0.03P_2 + 19$ Rs/MWhr

Q.6 a) Discuss the need of various compensation methods and the devices in detail. 10

b) Write short note on "Types of transactions and interchanges of energy" 10
