

Duration: 3 Hours

Total Marks: 80

Note: 1. Q. 1 is compulsory.

2. Solve any 3 questions out of remaining questions.
3. Assume suitable data if necessary.

Q.1 Solve any four

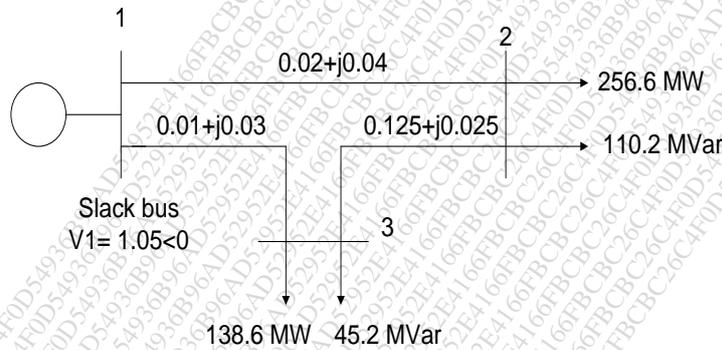
[20]

- a. Write assumptions made for obtaining approximate load flow equations
- b. What is the importance of power pool in interchange of energy?
- c. What is an equal area criterion?
- d. What are the assumptions made in Fast decoupled load flow studies?
- e. Draw heat rate and write its importance for economic load dispatch

Q2

- a. For the given diagram of 3 bus system, line impedances are marked in pu on a 100MVA base, voltage at slack bus and scheduled loads are given at buses 2 and 3. Use GS method to calculate voltage at bus 2 and 3, after first iteration.

[10]



- b. Derive the swing equation for a synchronous machine that describes the rotor dynamics.

[10]

Q3

- a. Explain formation of Y bus by singular transformation.
- b. A two bus system is considered. If a load of 125MW is transmitted from plant 1 to load a loss of 15.635MW is increased. Determine generation schedule and load demand if cost of received power is Rs 24MW/hr. Solve the problem using coordination equations and penalty factor approach. The incremental production costs of plants are

[10]

$$\frac{dF_1}{dP_1} = 0.025P_1 + 15 \qquad \frac{dF_2}{dP_2} = 0.05P_2 + 20$$

[10]

Q4

- a. Derive the expression for the exact coordination equation.
- b. Explain dynamic response of load frequency controller with and without integral control action.

[10]

[10]

Q5

- a. A 60Hz generator is delivering 50% of maximum permissible power through a transmission [10] system to an infinite bus. A fault occurs and causes transfer reactance to increase to 400 % of the value before fault. When the fault is isolated and the maximum power transfer is 75% of the original maximum value. Determine the critical clearing angle using equal area criterion.
- b. Explain the load frequency control by turbine speed governing system and derive the speed governing model. [10]

Q.6 Write short notes on [20]

- a. Optimal Unit commitment and reliability considerations.
- b. P-V curve for voltage stability analysis

-----