

BE SEM VII C Scheme Summer 2025 ELEC
4/06/2025

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.

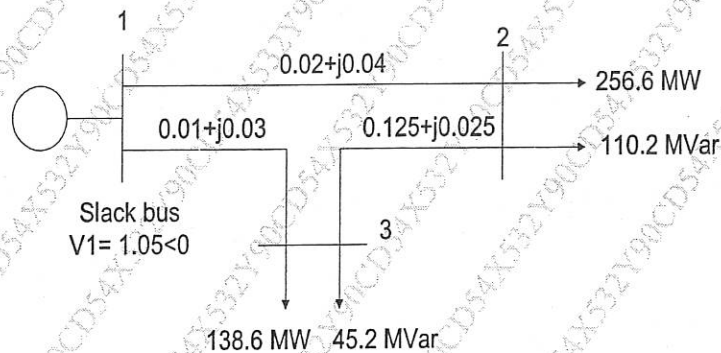
Q.1

[20]

- What are the assumptions made in transient stability studies?
- What is an equal area criterion?
- What are the assumptions made in Fast decoupled load flow studies?
- Draw and explain heat rate curve and input output curve.

Q.2

- 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]



- Derive the swing equation for a synchronous machine that describes the rotor dynamics. [10]

Q.3

- Explain formation of Y bus by step by step method. [10]

- The fuel cost functions for three thermal plant in Rs/h are given by [10]

$$C_1 = 500 + 5.3P_1 + 0.004P_1^2$$

$$C_2 = 400 + 5.5P_2 + 0.006P_2^2$$

$$C_3 = 200 + 5.8P_3 + 0.009P_3^2$$

Where P_1 , P_2 and P_3 are in MW. The total load PD is 800 MW. Neglecting transmission line losses and generator limits, find the optimal dispatch and the total cost in Rs/h.

Q.4

- a. Derive the expression for the exact coordination equation. [10]
- b. Explain dynamic response of load frequency controller with and without integral control action. [10]

Q.5

- a. A 60Hz generator is delivering 50% of maximum permissible power through a transmission 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. [10]
- b. Explain the load frequency control by turbine speed governing system and derive the speed governing model. [10]

Q.6 Write short notes on

- a. Power pool and transactions
- b. Optimal Unit commitment

[20]