

Roll No.....

MEHP/MEPS/MTPS-102

M.E./M.Tech., I Semester

Examination, November 2022

Power System Dynamics Analysis and Control

Time : Three Hours

Maximum Marks : 70

- Note: i) Attempt any five questions
ii) All questions carry equal marks.

1. a) Give the comparison of angle and voltage stability.
b) Discuss briefly how the following components of power system affect voltage stability of the system: HVDC line, Generator bus voltage, Shunt capacitor, Series capacitor
2. a) Define the terms "System" and "Model" Explain system model with suitable example.
b) Discuss the method of Excitation control of alternator using simplified representation.
3. Enlist the salient steps for modelling of synchronous machine. Explain Park's transformation approach for it.
4. What are the types of excitation systems? Develop the mathematical model of excitation system and also explain various control and protective schemes of excitation system.
5. a) Explain D-Q transformation using L-B variables for a typical long transmission line.
b) Discuss the dynamics of synchronous generator connected to estimate bus using synchronous machine.

6. Enumerate transient response of a synchronous machine under:
a) Connected to a voltage source
b) Connected to an external network
7. A 60 Hz, 4 pole turbo-generator rated 100MVA, 13.8 KV has inertia constant of 10 MJ/MVA:
a) Find stored energy in the rotor at synchronous speed.
b) If the input to the generator is suddenly raised to 60 MW for an electrical load of 50 MW, find rotor acceleration.
c) If the rotor acceleration calculated in part (b) is maintained for 12 cycles, find the change in torque angle and rotor speed in rpm at the end of this period.
d) Another generator 150 MVA, having inertia constant 4 MJ/MVA is put in parallel with above generator. Find the inertia constant for the equivalent generator on a base 50 MVA.
8. Write short note on any two of following.
i) Dynamic load
ii) Rotor angle stability
iii) SVC compensator
