School of Engineering

M.Tech Power System Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

Sem II - G2PI203T - Power System Dynamics and Stability

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	Differentiate between single machine and multimachine stability study.	K1(2)
2)	Explain why transient stability limit is less than that of steady-state stability limit.	K2(4)
3)	Explain the circumstance under which exciter control fails.	K2(6)
4)	A power station A consists of 2 alternators. The alternator-1 has a rating of 50 MVA, 50 Hz, 1500 rpm and has an inertia constant of 8 MJ / MVA. The alternator -2 has rating of 100 MVA, 50 Hz, 3000 rpm and has an inertia constant of 4 MJ / MVA. Find the inertia constant for the equivalent generator on a base of 100 MVA.	K3(9)
5)	A 50 Hz generator of reactance 0.8 pu is connected to an infinite bus through a line of 0.4 pu reactance. E = 1.05 pu, V = 1.0 pu. The inertia constant is 4MJ/MVA. The generator is loaded to 70% of the maximum power limit. Illustrate and find the frequency of natural oscillation.	K3(9)
6)	Exmine the problems with reactive power transmission over the line.	K5(10)
7)	A 50 Hz, 4-pole turbo generator is rated 500 MVA, 22 kV and has an inertia constant H of 7.5. Assume that the generator is synchronized with a large power system and has a zero accelerating power while delivering a power of 450 MW. Suddenly its input power is changed to 475 MW. Analyze the condition and find the speed of the generator in rpm at the end of a period of 10 cycles. The rotational losses are assumed to be zero.	K4(12)
8)	Examine comprehensively the state space representation of a synchronous machine connected to infinite bus.	K5(15)
9)	Examine why are pilot exciters so important in power systems. Discuss the challenges in suitable pilot exciter selection.	K5(15)
10)	Discuss the effect of governor action and exciter action on power system stability.	K6(18)