Sub Code: MPST-102 **ROLL NO.**

Model Question Paper

COURSE: M.TECH. **BRANCH**: ELECTRICAL ENGINEERING

SEMESTER: 1 **SUBJECT**: POWER SYSTEM STABILITY AND CONTROL

Duration: 3:00 hrs **Max marks: 100**

Note: Attempt all questions.

1. **Attempt any four parts of the following.** **5x4 =20**

   A. List out different ways to analyze the voltage instability and collapse.

   B. Explain the Load Modelling of Induction machines.

   C. Explain the numerical methods used for the analysis of transient stability.

   D. Write note on continuation power-flow analysis.

   E. Derive the flux linkage equations of the synchronous machine and draw its equivalent circuits?

2. **Attempt any two parts of the following.** **5x4=20**

   A. Derive the swing equation of a synchronous machine.

   B. Describes the classification of power system stability.

   C. Discuss the methods to improve steady state and transient stability.

   D. Derive sending and receiving end voltage in terms of real and reactive power.

   E. Explain the rotor angle stability.

3. **Attempt any two parts of the following.** **10x2=20**

   A. Explain in detail the power system stability problems.

   B. Discuss the various methods of improving small signal stability.

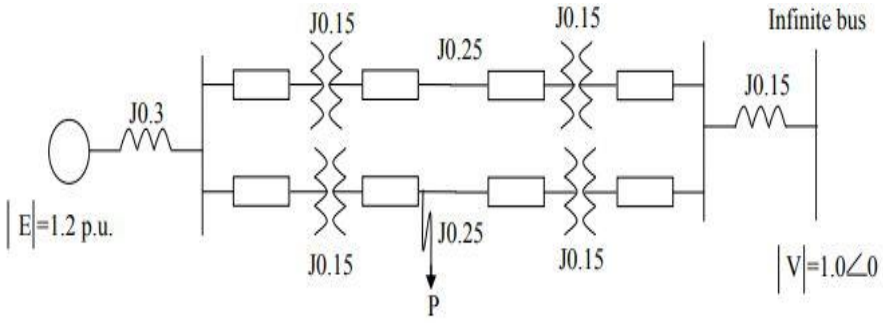
   C. Explain in detail voltage stability enhancement.

4. **Attempt any two parts of the following.** **10x2=20**

   A. Illustrate the two axis model for a cylindrical rotor machine.

   B. Explain in detail about the Control of HVDC Systems.

C. Find the critical clearing angle for the system shown for a three phase fault at the point P. The generator is delivering 1.0 p.u. power under pre-fault conditions.



5. Attempt any two parts of the following. 10x2=20

A. What is power angle diagram? Explain clearly the equal area criterion for studying the transient stability of a power system.

B. 50Hz, 4-pole turbo generator rated 20MVA, 13.2KV has an inertia constant of H=9.0KW-Sec/KVA. Determine the K.E. stored in the rotor at synchronous speed. Determine the acceleration if the input less the rotational losses is 25000HP and electric power developed is 15000KW. If the acceleration computed for the generator is constant period of 15 cycles, determine the change in torque angle in that period and the rpm at the end of 15 cycles. Assume that the generator is synchronized with a large power system and has no accelerating torque before the 15 cycle period begins.

C. Draw and explain the model of a detailed excitation control system. What are the different IEEE models for use in transient and small signal stability studies?