

OR

Code No.OR-NRB0701

JAWAHARLAL NEHRU TECHNOLOGY UNIVERSITY, HYDERABAD
M .Tech. II Semester Supplementary Examinations, March – 2009
POWER SYSTEM CONTROL AND STABILITY
(Electrical Power Systems)

Time: 3 hours

Max. Marks.60

Answer any Five questions
All questions carry equal marks

1. Describe the classical model of one machine connected to an infinite bus and obtain its equivalent circuit.
2. A synchronous machine having inertia constant $H = 4.0$ MJ/MVA is initially operated in steady state against an infinite bus with angular displacement of 30 elec. deg. and delivering 1.0 pu power. Find the natural frequency of oscillation for this machine assuming small perturbances from the operating point.
3. With the help of neat block diagram, analyse the effect of voltage and speed control of a synchronous machine with voltage regulation with one time lag.
- 4.a) Explain the concept of dynamic stability.
b) Derive the approximate model of the complete exciter.
5. Construct a simplified linear model of excitation system. Derive the state space equations for the description of the same.
- 6.a) Describe the effect of excitation on generator power limits.
b) With the help of a block diagram, derive the state space equations of Type 3 excitation representation.
- 7.a) Derive Lyapunov's function for single machine connected to infinite bus.
b) Write short notes on Popov method of determination of stability.
- 8.a) Write notes on control of voltage instability.
b) Analyse the voltage instability and collapse.

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