NR/R09

Code No: A4901/C4901, C6401

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I - Semester Examinations, October/November-2011

POWER SYSTEM DYNAMICS

(COMMON TO ELECTRICAL POWER ENGINEERING, POWER ENGINEERING AND ENERGY SYSTEMS)

Time: 3hours **Max. Marks: 60**

Answer any five questions

All questions carry equal marks

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1.a) Distinguish between steady state and transient stability of power system network.
b) With the help of a neat block diagram, explain different operating states of a typical power system network.
c) Write the assumptions made in modeling the synchronous machine in stability analysis of power system network. [12]

2.a) Obtain Flux linkage and Voltage equations of a synchronous machine model used in power system dynamic studies.
b) Write the advantages of per unit system.
c) Draw two equivalent circuits of synchronous machine corresponding to the two axes d and q. [12]

3.a) Develop the stator equations and rotor equations of a synchronous machine connected to infinite.
b) Obtain the transfer function of IEEE Type-1 excitation system. [12]

4.a) Obtain the small signal modeling of a single machine system.
b) Explain the significance of synchronizing and damping torque analysis of a single machine system. [12]

5.a) Name the major factors that contribute to the instability of power system network.
b) Obtain the simplified model of a single machine connected to infinite bus.
c) Draw the block diagram of PSS. [12]

6.a) Is swing equation used in the steady-state stability studies of power system network? Justify your answer.
b) Draw the functional block diagram of excitation control system of a synchronous generator and explain each block. [12]

7.a) Write the importance of Washout circuit used in control circuit of synchronous generator.
b) Derive the Swing Equation of a synchronous machine connected to infinite bus. [12]

8. Write short notes on:
a) Park's transformation
b) Application of Routh-Hurwitz criteria to a single machine system.
c) Static exciter. [12]

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