R09

Code No: C6401, C4901

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.TECH I Semester Examinations, April/May -2012

POWER SYSTEM DYNAMICS

(COMMON TO Power Engineering & Energy Systems, Electrical Power Engineering)

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

Answer any five questions

All questions carry equal marks

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1.a) From fundamentals derive the swing equation of a single generator connected to a parallel lines through the transformer.

b) A two pole 50Hz,11 kV turbo alternator has a ratio of 120MW, power factor 0.86lagging. The rotor has a moment of inertia of 10,000 kgm^2. Calculate H and M.

2. a) Explain why the synchronous machine rotor self inductances are constant.

b) Discuss the following:
i) Stator and rotor base quantities
ii) Measurement of characteristic reactance x_c

3. a) From the fundamentals obtain the block diagram representation of separately excited DC generator.

b) A generator is connected to an infinite bus through an external impedance of jXe. If $E_b = V_{to} = 1.0$ p.u. Find the initial conditions. Assume $x_e = 0.28$ p.u. Consider the generator data: $x_d = 1.8$, $x_q = 1.7$, $x'_d = 0.18$, $x'_q = 0.25$, $R_a = 10.0$, $T''_d = 0.5$ sec, $T''_q = 0.1$ sec, H = 5 Sec and $f_B = 50$ Hz.

4. From the fundamentals obtain the overall block diagram representation of SMIB.

5. Discuss the following:
i) Dynamic compensator
ii) Basic concepts in applying PSS

6.a) Explain in detail about the point by point method of solution for transient stability.

b) Obtain computation of $\dot{C}$ p $[Cp]^{-1}$.

7. Obtain the transformation equations of stator voltage and torque equations.

8. Explain about synchronizing and damping torque analysis application case 1 and case 2.

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