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Roll No.....

MEHP/MEPS/MTPS-102

M.E/M.Tech., I Semester

Examination, December 2017

Power System Dynamics Analysis & Control

Time : Three Hours

Maximum Marks : 70

Note: i) Answer any five questions.

ii) All questions carry equal marks.

iii) Assume any suitable data if necessary.

1. a) What is power system stability? Explain in brief rotor angle stability. 7

   b) Explain terms voltage stability and voltage collapse. 7

   OR

   Explain terms Mid-term and Long-term stability. 7

2. a) How to compute steady-state values? 7

   b) Explain following terms : 7

   i) Steady-State Stability

   ii) Transient Stability

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Draw and explain block diagram of excitation syste

3. a) Explain d90 transformation of synchronous machine.

   b) What is basic equations of a synchronous machine? Writ down stator circuit equations. 7

   OR

   Write down per unit systems for the stator quantities of a synchronous machine. 7

4. a) Explain per unit system for the rotor of a synchronous machine. 7

   b) A 555 MVA, 24 kV, 09 PF, 3-phase, 2-pole synchronous generator has the following inductances and resistances associated with the stator and field windings. 7

$L_{aa} = 3.2758 + 0.0458 \cos(2\theta)$ mH

$L_{ab} = -1.6379 - 0.0458 \cos\left(2\theta + \frac{\pi}{3}\right)$ mH.

$L_{afd} = 40.0 \cos\theta$ mH

$L_{ffd} = 576.92$ mH

$R_a = 0.0031\ \Omega$

$R_{fd} = 0.0715\ \Omega$

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i) L_d and L_q in H.

ii) If the stator leakage inductance L_i is 0.4129 mH determine L_{ad} and L_{aa} in H.

iii) Using the machine rated values as the base values for the stator quantities, determine the PU values of the following in the L_{ad}-base reciprocal per unit system L_i, L_{ad}, L_d, L_{afd}, L_{ffd}, R_a, R_{fd}.

OR

Draw equivalent circuit for direct and quadrature axis of a synchronous machine. 7

5. a) Discuss in brief modelling of excitation system components. 7

b) Discuss in brief modelling of complete excitation systems. 7

6. a) Write short notes : 7

i) System representation by state evasions.

ii) Prime move control systems.

b) Draw and explain block diagram representation of the small-signal performance of single machine system. 7

OR

Explain in brief static var compensators. 7

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7. a) What is effect of automatic voltage regulator action on synchronizing and damping torque. 7

OR

Explain inclusion of SVC model. 7

b) Draw and explain block diagram representation of power system stabilizer. 7

8. Write short notes (any two) : 14

i) Security System

ii) Transient analysis of synchronous machine

iii) Non linear oscillators

iv) Tuning of PSS

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