Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech. Winter 2018- 19 Examination

Semester: 1 **Date: 11/12/2018**
Subject Code: 203207102 **Time: 10:30 am to 1:00 pm**
Subject Name: Power System Dynamics-1 **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Discuss the classification of power system stability. **(05)**

B) Explain the classification of synchronous machine model as per IEEE Model 1.0 & Model 1.1 **(05)**

C) What is the significance of transient and sub transient term in standard parameter? **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

A) Describe the 3 Ø short circuits at the terminal of a synchronous machine.

B) What do you understand by the magnetic saturation?

C) Derive the expression for the stator self-inductance in induction machine

D) Draw the different eigen values corresponding to the trajectory behavior around the singular point in a two-dimensional case.

Q.3 A) Derive the torque expression in dq_o frame **(07)**

$$T_e^{'} = \frac{3}{2} k_d k_q [\psi_d i_q - \psi_q i_d]$$

B) Explain the block diagram of d and q –axis network in identifying terminal quantities. **(08)**

OR

B) How the d-axis operation inductance is related to time constant term. **(08)**

Q.4 A) Write a short note on volts per hertz limiter and protection. **(07)**

OR

A) Explain various components of block diagram representation of general excitation system. **(07)**

B) Derive the system characteristics equation for small signal analysis of a single machine infinite bus (SMIB) system (using classical model of generator).The equation of motion required for calculation in pu are given by **(08)**

$$p\Delta\boldsymbol{\omega}_r = \frac{1}{2H}(T_m - T_e - K_D \Delta\boldsymbol{\omega}_r)$$

$$p\delta = \boldsymbol{\omega}_0 \Delta\boldsymbol{\omega}_r$$