PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter 2019- 20 Examination

Semester:1   Date:17/12/2019
Subject Code: 203207102   Time:10:30 am to 01:00 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) What is the significance of transient and sub transient term in standard parameter?   **(05)**
     B) What do you understand by the magnetic saturation Explain in brief?   **(05)**
     C) Give the classification of power system stability.
                                                                                                                 (05)

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark)   **(15)**
     A) Draw the different eigen values corresponding to the trajectory behavior around the singular point
        in a two-dimensional case
     B) Explain the classification of synchronous machine model as per IEEE Model 1.0 & Model 1.1
     C) Derive the expression for the stator self inductance in induction machine
     D) Describe the 3 Ø short circuits at the terminal of a synchronous machine.

Q.3 A) Derive the expression torque expression in dqo frame
$$T_e \;=\frac{3}{2}\, k_d k_q [\varphi_d i_q - \varphi_q i_d]$$
                                                                                                                 (07)
     B) Draw the phasor diagram for the under excited synchronous machine generator conversion   **(08)**
                                                    OR
     B) Draw the phasor diagram for the under excited synchronous machine motor conversion.
                                                                                                                 (08)

Q.4 A) Explain various components of block diagram representation of general excitation system.   **(07)**
                                                    OR
     A) Write a short note on volts per hertz limiter and protection.   **(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)**
                        $p\Delta\omega_r = (1/2H) (T_m - T_e - KD\, \Delta\omega_r)$
                        $p\delta = \omega_0\, \Delta\omega_r$