# Second Semester Examination 2013

## POWER SYSTEM DYNAMICS

Time: 3 Hours
Max marks: 70

Answer any SIX questions including Question No. 1 which is compulsory.
The figures on the right hand side indicate marks.

1.  Answer the following Questions                                                    2 × 10

    a) Draw the schematic diagram of 3 phase synchronous machine?
    b) What do you mean by voltage stability?
    c) What is the role of governor in hydraulic turbine?
    d) What is the basic function of power system stabilizer?
    e) Classify stability?
    f) What is an infinite bus?
    g) What is the role of AVR in maintaining the stability of interconnected power system?
    h) Differentiate steady state and transient stability?
    i) Define stabilizer gain?
    j) List out the elements of an existing system?

2.                                                                                    5 × 2

    a) Draw and explain the block diagram representation with exciter and AVR?
    b) Briefly explain the small signal stability improvement methods?

3.                                                                                    5 × 2

    a) Explain the mathematical model of governor for hydraulic turbine?
    b) Discuss the relationship between Eigen properties and transfer function?

4.

    a) Explain the block diagram representation of small signal model of single machine infinite
       bus system with K constants?                                                   6
    b) What do you mean by mid-term and long-term stability?                          4

5.  Draw the stator and rotor circuits of a synchronous machine and derive the basic equations of
    stator and rotor of synchronous machine?                                         4+6

6.                                                                                    5 × 2

    a) What do you mean by phase lead compensation?
    b) Briefly explain excitation control design?

7.                                                                                    5 × 2

    a) Explain the characteristics of series capacitor of compensated transmission systems?
    b) Briefly explain the turbine generator torsional characteristics?

8.  Write short notes on any two                                                      5 × 2
    a) Stability improvement by power system stabilizer
    b) Multimachine potential energy boundary surface
    c) Sub synchronous oscillation