



- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.
 5. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.
 6. Attempt **any five** questions.
 7. Use of non-programmable calculator is permitted.

1. a) Explain with neat block diagram of excitation system in power system generation. 7
 b) How does the Excitation system affects the stability limit? What are the limitation of quick response excitation? 7
2. a) Derive equation for unregulated synchronous machine and explain effect of 7
 i) Demagnetization of armature reaction ii) Small change in speed
 b) What do you mean by synchronizing coefficient? Derive the expression and hence explain the condition of stability. 7
3. a) Find the modes of oscillation of a three-machine system. The machines are unregulated and classical model representation is used. 7
 b) Give the representation of non-linear load for small single model. 7
4. a) Derive two axis model of synchronous machine for salient pole machine. 7
 b) Explain the active method for islanding detection. 7
5. a) Explain why rotor self-inductance are constant and derive rotor mutual inductance in the term of coefficient of coupling of these coils. 7
 b) Draw and explain the voltage stability problem of a single machine connected to load through a line. 7
6. a) Explain the PSS [Power System Stabilizer] design and give its application? 7
 b) State and explain the equation for small signal model. 7
7. a) Distinguish clearly between steady state stability, transient stability and dynamic stability. 7
 b) Explain the improved model of synchronous machine? Explain in detail SVC model diagram? 7
8. Write short note on **any two**. 14
 i) SCR of synchronous machine.
 ii) Implication of power system Dynamic on stability of the power system.
 iii) Control of voltage instability and voltage collapse.
