Roll No……..….. **Total No. of Printed Pages: 1**
Total No. of Questions: [11]

M. Tech. EE (Power System) (Semester-2nd)
POWER SYSTEM DYNAMICS & STABILITY
Subject Code: MELES2202
Paper ID: 22191311

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It carries 16 marks. It consists of 4 questions of 4 marks each.
2. Section B consist of 4 questions of 8 marks each. The student has to attempt any 3 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(4 marks each)**

Q1. Describe how a synchronous machine's equivalent circuit representation works.
Q2. How do dynamic load models differ from static load models, and why are they important in power system studies?
Q3. What factors contribute to voltage instability, and how is it assessed?
Q4. Explain the need of an Automatic Voltage Regulator (AVR) in a power system.

Section – B **(8 marks each)**

Q5. Describe Park's transformation and its purpose in the context of synchronous machine modelling. Draw a phasor diagram for a synchronous machine.
Q6. Enlighten the dynamics of synchronous machines in terms of electromechanical transients. What are the main variables affecting synchronous machines' dynamic behaviour?
Q7. Explain the concept of state-space representation for dynamic systems. What are the advantages of state-space representation for system stability analysis?
Q8. Describe the classical model used to represent a generator in a single machine infinite bus system. What are the key parameters and assumptions of this model?

Section – C **(10 marks each)**

Q9. Write the steady-state characteristics of an induction motor. What parameters influence the performance of an induction motor under steady-state conditions?
Q10. Discuss the strategies and methods for preventing voltage collapse. How can operators and control systems proactively address voltage stability issues?
Q11. With the help of suitable flow diagram, describe an overview of the fundamentals of Automatic Generation Control. How does AGC contribute to maintaining the balance between generation and load?