



**ELECTIVE - I**  
**Linear System Theory**  
**(1053)**

**P. Pages : 1**

**Time : Three Hours**

**Max. Marks : 100**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Assume suitable data if necessary.
5. Solve **any five** questions.

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|---|----|
| 1. a) Discuss the properties of State Transition Matrix.              | 10 |
| b) Explain the Various operations on Matrices.                        | 10 |
| 2. a) State and Explain Cayley Hamilton Theorem.                      | 10 |
| b) What are the limitations of Conventional Control Theory?           | 10 |
| 3. a) Explain singular value decomposition (SVD)                      | 10 |
| b) Explain Controllability and its types.                             | 10 |
| 4. a) Explain Sampled Spectra and Aliasing.                           | 10 |
| b) What is Filtering? Explain Ideal Low Pass Filter.                  | 10 |
| 5. a) Explain Empirical rules for the selection of sampling interval? | 10 |
| b) Explain Principle of Discretisation.                               | 10 |
| 6. a) Explain Time domain model for Discrete Time Systems.            | 10 |
| b) State and Explain Kalman's Test.                                   | 10 |
| 7. a) Explain Stability improvement by State Feedback.                | 10 |
| b) Explain Concept of Eigen Value and Eigen Vector.                   | 10 |
| 8. a) Explain State Space representation of discrete system.          | 10 |
| b) Explain Observability in details.                                  | 10 |

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