

Enrollment No./ Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

MASTER OF ENGINEERING - SEMESTER - 2 EXAMINATION – SUMMER 2026

Subject Code: 3722712

Date: 11-06-2026

Subject Name: Advanced Digital Signal Processing

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

- Q.1 (a)** Discuss structures for the realization of discrete-time system. What are major factors that influence choice of the realization on the discrete-time system? **07**
- (b)** Discuss various structures for FIR systems. **07**
- Q.2 (a)** Explain special types of Random Processes **07**
- (b)** Explain the IIR Filter Design by Approximation of Derivatives. **07**
- OR**
- (b)** Explain the IIR Filter design by the Bilinear Transformation in details. **07**
- Q.3 (a)** What are properties of the linear prediction error filters? Explain with their significance. **07**
- (b)** Explain Kalman filter in details **07**
- OR**
- Q.3 (a)** Explain Backward linear prediction filter in details **07**
- (b)** Explain AR Lattice and ARMA Lattice-Ladder Filters in details. **07**
- Q.4 (a)** Explain Gradient estimation and its effect on adaptation **07**
- (b)** Explain narrowband interference application in context of adaptive filters. **07**
- OR**
- Q.4 (a)** Discuss the LMS algorithm in details. **07**
- (b)** Explain channel equalization application in context of adaptive filter **07**
- Q.5 (a)** Explain sampling rate conversion by a rational factor I/D **07**
- (b)** Explain poly phase filter suitably. **07**
- OR**
- Q.5 (a)** Explain concept of digital filter banks in context of multi rate digital signal processing. **07**
- (b)** What is Wavelets? How Wavelets used in the DSP? **07**
