

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 2161001

Date: 08/06/2026

Subject Name: Digital Communication

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.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a) Draw the block diagram of PCM system and explain it. **03**
 - (b) Discuss the sampling theorem in time domain. **04**
 - (c) Explain Adaptive Delta modulation and demodulation technique and list the merits and demerits of this technique **07**
- Q.2**
- (a) What is Eye diagram? Explain the significance of it in the pulse detection technique. **03**
 - (b) Derive the expression of signal to noise ratio for PCM **04**
 - (c) Explain Scrambler and Descrambler in a detail with diagram **07**
- OR
- (c) Explain the different type of line coding techniques with suitable diagrams. **07**
- Q.3**
- (a) Explain T1 Carrier System **03**
 - (b) Draw the block diagram of FSK modulation technique and explain it. **04**
 - (c) Discuss the QPSK demodulation technique **07**
- OR
- Q.3**
- (a) Explain Noise temperature and its significance in demodulation technique. **03**
 - (b) Discuss the MSK modulation technique and list the merits of it. **04**
 - (c) Explain the demodulation of BPSK technique **07**
- Q.4**
- (a) What is conditional probability? Explain it with suitable example **03**
 - (b) Define the terms Mean, Central moment and Variance of a Random Variable. **04**
 - (c) What is PDF? Write the properties of PDF **07**
- OR
- Q.4**
- (a) What are the types of random variables? Explain them **03**
 - (b) Explain how error free communication can be achieve over noisy channel? **04**
 - (c) Discuss and prove the properties of CDF **07**
- Q.5**
- (a) What is Entropy? Explain in brief **03**
 - (b) Explain Cyclic code with suitable example **04**
 - (c) Derive the channel capacity expression for band limited AWGN channel. **07**
- OR
- Q.5**
- (a) Explain regenerative repeater **03**

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| (b) Differentiate between Convolutional codes and Block codes | 04 |
| (c) Discuss the practical communication system in lights of Shannon theorem. | 07 |
