# DIGITAL COMMUNICATION LAB

**Electrical Engineering Department**

## Experiment 3: Delta Modulation

**AIM**: To analyse Delta modulation and Demodulation using breadboard

**Components Required:**

- Breadboard
- Digital Storage Oscilloscope (DSO)
- D flip-flop
- Function Generator
- 741 Operational Amplifier
- Resistors: 10k$\Omega$
- Capacitor: 0.1$\mu$F
- Wires and Probes

**Theory**

Delta modulation (DM), sometimes called slope modulation encodes the difference between successive samples rather than the absolute value of the signal. In DM, an incoming message signal is oversampled (i.e., at a rate much higher than the Nyquist rate) to purposely increase the correlation between adjacent samples

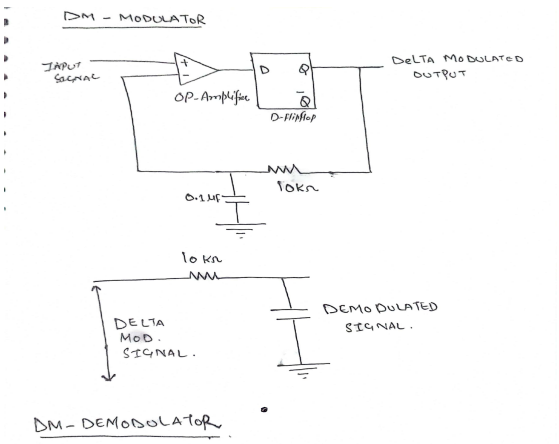


Figure 1: Circuit Diagram

of the signal. This is done to permit the use of a simple quantising strategy for constructing the encoded signal. In its basic form, DM provides a staircase approximation to the oversampled version of the message signal. The core idea is to track changes in the signal by comparing the current sample with the previous sample and encoding whether the signal has increased or decreased. The algorithm for a delta modulation system is a simple one. It transmits information to only indicate whether the analog signal it encodes is to go up or go down. If the current sample is smaller than the previous sample then logic 0 is transmitted or logic 1 is transmitted if the current sample is larger than the previous sample.

**PROCEDURE:**

1. Make the connections as per the circuit diagram.

2. Take the sine wave as input from the function generator.

3. Fix the frequency, amplitude, and offset voltage for the input signals.

| Parameters | Input signal | Modulated signal | Demodulated signal |
|---|---|---|---|
| **Frequency** | | | |
| **Time Period** | | | |
| **Amplitude** | | | |

4. Observe the modulated output signal on the DSO and note down the frequency.

5. Observe the modulated and demodulated signal and note down the frequencies.

**WAVEFORM:** Carefully plot the waveform of Delta Modulated signal with the reconstructed signal

**Conclusion**: Generation of Delta Modulated signal and reconstruction.