

**OR**

1. Derive the expression for NBFM signal and give the block diagram for its output generation. (8)
2. Write a short note on frequency and phase modulation with their analogies. (8)

**Unit - III**

1. Explain differential pulse code modulation and compare it with PCM on the basis of bit transmission rate. (16)

**OR**

1. Draw the block diagram of Adaptive Delta Modulation. Explain its working and compare with PCM. (8)
2. A PCM system uses a uniform quantizer followed by a V bit encoder. Show that RMS signal to quantization noise ratio given as  $(1.8+6V)$ dB. (8)

**Unit - IV**

1. Write a short note on modulation and demodulation techniques of PPM. (10)
2. Explain various PAM formats like Unipolar RZ & NRZ, Polar RZ & NRZ signals for sequence 1100101011001011001. (6)

**OR**

1. Explain the cause of Inter Symbol Interference (ISI) and the methods to remove it. (10)
2. Describe the natural sampling of generation of PAM signal in detail. (6)

**Unit - V**

1. Explain the generation and reception of BPSK signal. (8)
2. Calculation the error probability for ASK modulation technique. (8)

**OR**

1. Describe minimum shift keying and explain with reason why it is named so. (8)
2. Compare ASK, PSK and FSK. (8)