



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering
Final Examination, Summer-2026

Course Code: 0714-311
Section: A, B, C, D, E
Full Marks: 40

Course Title: Communication Engineering
Level-Term: L3-T1
Exam Date: August 27, 2026

Teacher's Initial: FHT, AB
Time: 2 Hours

Answer all Questions

[The second right most column indicates the course outcomes with respective Bloom's level and right most column indicates the allocated marks]

Q1. (a) Explain in detail the rectifier detection method used for AM demodulation. CO-2 4
C(2)

(b) Sketch FM and PM wave for the modulating signal $m(t)$ shown in following Fig.1. The constant k_f and k_p are $2\pi \times 10^5$ and 10π respectively, and the carrier frequency is 100 MHz. CO-2 4
C(4)

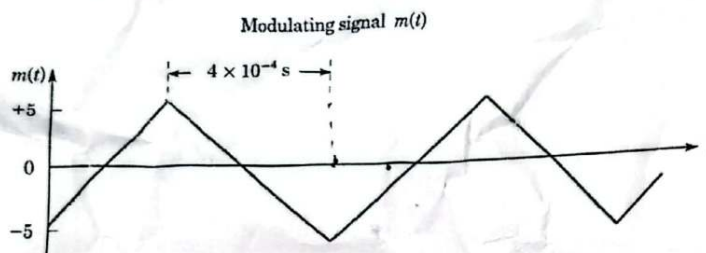


Fig.1

Q2. (a) State sampling theorem. Explain aliasing effect with figures. CO-2 3
C(2)

(b) An analog message signal $m(t)$ is bounded between -12 V and $+12$ V. A 3-bit PCM system is used to transmit the signal. The sampler produces the following voltage samples at discrete time intervals: 10.2, 8.4, 4.7, 1.2, -1.6 , -5.1 , -8.4 , -10.1 V CO-4 5
C(4)

- (i) Calculate the quantization step size (Δ).
- (ii) Determine the quantized voltage values m_q (nTs) and their corresponding binary codes using a Mid-Rise quantizer, and show the graphical representation.
- (iii) Calculate the quantization noise for the first and last sampled data point in the mid-rise scheme.

Q3. (a) For the binary data sequence 1100101, sketch the ASK, FSK, and BPSK carrier waveforms corresponding to each bit. Label the amplitude, frequency, and phase changes where applicable. CO-2 3
C(3)

(b) Determine (i) the peak frequency deviation, (ii) minimum bandwidth and (iii) baud for a binary FSK signal with a mark frequency of 50 kHz, a space frequency of 46 kHz and an input bit rate of 2 kbps. CO-2 3
C(3)

(c) List the advantages and limitations of direct generation method of FM signal? CO-2 2
C(1)

Q4. (a) Illustrates the FDM multiplexing and demultiplexing processes with diagram. Explain why guard bands are required between adjacent channels. CO-2 5
C(2)

(b) An FDM system combines six channels, each having a bandwidth of 80 kHz. If a guard band of 8 kHz is required between adjacent channels. Determine the total bandwidth required for the transmission link and clearly label the bandwidth of each channel, guard bands, and the total transmission bandwidth on the diagram. CO-2 3
C(3)

Q5. (a) A digital communication system receives the binary sequence 10101100. Sketch the corresponding waveforms using Unipolar NRZ, Unipolar RZ, Polar NRZ, and Polar RZ line coding techniques. 4

NRZ

(b) Differentiate between
(i) serial and parallel data transmission
(ii) synchronous and asynchronous data transmission 4