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**Daffodil International University**
Department of Electrical and Electronic Engineering, Faculty of Engineering
Mid-Term Examination, Fall – 2025

Course Code: 0714-311 | Course Title: Communication Engineering
Section: A, B, C | Level-Term: L2-T2 | Teacher's Initial: DTF
Full Marks: 25 | Date: October 22, 2025 | Time: 1.5 Hours

[**Notes:** Answer all the following questions]

| | | CO | Marks |
|---|---|---|---|
| **Q1.** | **What** do you mean by SQNR? **Prove** that for digital transmission is the signal to noise quantization ratio is $(SQNR)_{db} = 1.76 + b \times 6.02$ where b indicates the bit. | **CO-1 (C2)** | **[5]** |
| **Q2.** | **Define** modulation index for frequency modulation. **Derive** the final equation of phase modulation. | **CO-2 (C4)** | **[5]** |
| **Q3.** | **What** is Nyquist rate? **What** causes aliasing effect? **How** to combat this aliasing effect? | **CO-1 (C2)** | **[4]** |
| **Q4.** | In an FM system, the frequency deviation is 6 kHz when the audio modulating frequency is 400 Hz and the audio modulating voltage is 3 V. **Compute** the modulation index. Also, **compute** the frequency deviation and the modulation index if (i) AF voltage is increased to 6.5 V keeping the modulation frequency unaltered (ii) AF voltage is increased to 8 V while the modulation frequency is reduced to 220 Hz. | **CO-2 (C4)** | **[4]** |
| **Q5.** | A sinusoidal carrier voltage of frequency 1 MHz is amplitude modulated by a sinusoidal voltage of frequency 10 kHz resulting in maximum and minimum modulated carrier amplitudes of 85 and 75 volts respectively. **Calculate** (a) the unmodulated carrier amplitude (b) modulation index and (c) amplitude of each sideband. | **CO-2 (C4)** | **[4]** |
| **Q6.** | The rms value of a radio frequency voltage is 80 volts. After amplitude modulation by a sinusoidal audio voltage, the rms value of the RF voltage becomes 88 volts. **Compute** the modulation index. | **CO-2 (C4)** | **[3]** |