भारतीय सूचना प्रौद्योगिकी संस्थान कोटा
Indian Institute of Information Technology, Kota

B.Tech. (Electronics and Communication Engineering)
End Term Examination, Even Semester 2023-24

Analog Communication (ECT202)

MM: 40 **Duration:120mins** **Date: 13-05-24**

Note: Only answers arrived at with proper logical procedure will be awarded full credit.

Q1. An AM signal and a Narrow Band FM signal with identical carrier, modulating signal and modulation index of 0.1 are added together. Find out the resulted signal expression and name of the resulted modulation technique? (4+3)

Q2. A 95MHz carrier is frequency modulated by a sinusoidal signal and the modulated signal is such that the maximum frequency deviation is 50kHz. If the modulating signal is 1KHz then calculate the modulation index and bandwidth of the modulated signal. (4+4)

Q3. A message signal with bandwidth of 10KHz is lower sideband SSB modulated with carrier frequency $f_{c1} = 10^6\ Hz$. The resulting signal is then pass through a narrow band frequency modulator with carrier $f_{c2} = 10^9\ Hz$. Calculate the output bandwidth of the resulted signal.

Q4. What is Pre-emphasis and De-emphasis where it is needed and why? (3+3)

Q5. Drive the general expression and spectrum of Narrow band FM and wide band FM also draw their spectrums. (5+6)

Q6. Write down the various demodulation techniques of FM and which one is more popular and why? (4+4)

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