Motilal Nehru National Institute of Technology Allahabad
Department of Electronics & Communication Engineering
End-Semester (Even) Examination (May-2018)
Programme: B. Tech. IV-Semester (CS & IT)
Subject: Communication Foundations (EC-1405)

Time: 3:00 Hours **Maximum Marks: 60**

NOTE: Attempt all the questions. Symbols and notations carry their usual meaning unless stated otherwise. Assume suitable data, if missing.

Q1 What are the different types of an Antenna? And state different parameters of an antenna. (8)

Q2 Explain different methods of propagation of EM waves. (8)

Q3 What is waveguide? Derive the expression for E_z and cut-off frequency of TM rectangular waveguide. (8)

Q4 What are the different parameters of a receiver? Explain the operation of a superhetrodyne receiver and also state the problems associated with it. (8)

Q5 With the help of an example explain the WBFM generation from NBFM signals. Also discuss the demodulation of WBFM. (8)

Q6 Explain digital modulation schemes ASK, PSK and FSK. (8)

Q7 A Compact disc (CD) records audio signals digitally by using PCM. Assume the audio signal bandwidth to be 15 kHz. (4)

a) What is the Nyquist rate
b) If the Nyquist samples are quantized into L = 65, 536 levels and then binary coded, determine the number of binary digits required to encode a sample
c) Determine the number of binary digits per second (bit/s) required to encode the audio signal.
d) Minimum bandwidth required to transmit the encoded signal

Q8 Consider the frequency modulated signal (4)
$10[\cos(2\pi \times 10^5 t + 5\sin(2\pi \times 1500t) + 7.5\sin(2\pi \times 1000t)]$. Find the followings

a) Maximum frequency deviation
b) Frequency sensitivity
c) Maximum phase deviation and modulation index
d) Bandwidth

Q9 Explain the process of analog to digital conversion with suitable example. (4)

END