

1 Names, Acronyms, Structures:

A/D: analog-to-digital converter

ADC: analog-to-digital converter

A-to-D: analog-to-digital converter

ARQ: Automatic repeat requests (stop & wait, go-back-N, selective-repeat)

ASK: Amplitude Shift Keying

BER: Bit Error Rate

bps: bits-per-second

Bps: bytes-per-second

CDMA: Code Division Multiple Access

CRC: cyclic redundancy check

CSMA: Carrier Sense Multiple Access

CSMA-CD: Carrier Sense Multiple Access with Collision Detection

1-P CSMA: one-persistent CSMA

n-P CSMA: non-persistent CSMA

p-P CSMA: p-persistent CSMA

DNS: Domain Name System

FDMA: Frequency Division Multiple Access

FSK: Frequency Shift Keying

GFP: Generic Framing Procedure

HTTP: Hypertext Transfer Protocol

IP: Internet Protocol

ISI: Intersymbol Interference

NRZ: Non-Return to Zero

PSK: Phase Shift Keying

QAM: Quadrature Amplitude Modulation

SDMA: Space Division Multiple Access SNR: Signal-to-Noise Ratio TCP: Transmission Control Protocol

TDMA: Time-Division Multiple Access

UDP: User Datagram Protocol

OSI Reference Model Layers: Application → Presentation → Session → Transport → Network → Data Link → Physical

WDM: Wavelength Division Multiplexing

2 Constant and Units

$c = 3 \times 10^8$ m/s (in free space), $c = 2 \times 10^8$ m/s (in media)

$1 \text{ \AA} = 10^{-10}$ m

$1 \text{ }\mu\text{m} = 10^{-6}$ m

$1 \text{ m} = 10^{-3}$ km

$1 \text{ s} = 10^3$ ms

kbps = 10^3 bps

Mbps = 10^6 bps

KBps = 10^3 Bps (the simplifying relation we will use unless otherwise specified)

MBps = 10^6 Bps (the simplifying relation we will use unless otherwise specified)

3 Equations

$$v = d/t$$

$$\log_x y = \frac{\log_a y}{\log_a x}, \quad \log_x(a \cdot b) = \log_x(a) + \log_x(b), \quad \log_x(y^z) = z \log_x(y)$$

$$C = W_c \log_2(1 + \text{SNR})$$

$$\text{sinc}(x) = \frac{\sin(\pi x)}{\pi x}$$

$$\mathcal{F}\{A \cdot \text{sinc}(a \cdot t)\} = \begin{cases} A, & -a/2 \leq f \leq a/2 \\ 0, & \text{else.} \end{cases}$$

$$\mathcal{F} \begin{cases} A, & -a/2 \leq t \leq a/2 \\ 0, & \text{else.} \end{cases} = A \cdot \text{sinc}(a \cdot f)$$

$$y(t) = a_0 + \sum_{k=1}^{\infty} a_k \cos(2\pi f_0 \cdot k \cdot t) + \sum_{k=1}^{\infty} b_k \sin(2\pi f_0 \cdot k \cdot t)$$

$$N = \lambda T$$