

UNIVERSITY OF PUNE

[4363]-252

T. E. (COMPUTER ENGINEERING) Examination 2013

DATA COMMUNICATIONS (310242)

(2008 Course)

[Total No. of Questions:]

[Total No. of Printed pages :2]

[Time : 3 Hours]

[Max. Marks : 100]

Instructions :

(1) *Neat diagrams must be drawn wherever necessary.*

(2) *Assume suitable data, if necessary.*

SECTION I

Q.1 a) Explain SNR, channel bandwidth and rate of communication. The power of a signal is 10mW and the power of noise is 1mW. What are the values of SNR, SNR_{dB} ? [8]

b) Explain the different frequency components present in 1kHz sine and 1kHz square waveform? [4]

c) Explain simplified communication system and mention various parts of communication system. [6]

OR

Q.2 a) An analog signal has a bit rate of 8000bps and a baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements do we need? [6]

b) Explain QAM analog modulation technique with constellation diagram. [6]

c) Explain statistical TDM with diagram. What are issues in TDM? [6]

Q.3 a) Assume that, in a Stop-and-Wait ARQ system, the bandwidth of the line is 1Mbps and 1 bit takes 20 ms to make a round trip. What is the bandwidth-delay product? If the system data frames are 1000 bits in length, what is the utilization percentage of the link? What is the utilization percentage of the line, if we have a protocol that can send up to 15 frames before stopping and worrying about acknowledgments?

b) Explain line coding polar schemes. [8]

OR

Q.4 a) Explain pulse code modulation technique. [8]

b) Represent Binary 01001110 in NRZ-L, NRZ-I, RZ, Manchester and differential Manchester, AMI. [8]

- Q.5 a) In Go-Back-N ARQ, the size of the send window must be less than 2^m [8]
and the size of the receiver window is always 1. Justify.
b) Describe Shannon's theorem on channel capacity. Explain with suitable [8]
example.

OR

- Q.6 a) In selective repeat ARQ, size of sender and receiver window must be at [8]
most one-half of 2^m . Justify.
b) At the CRC encoder if i)the data word is 1001 and divisor is 1011, find
the code word and ii)the codeword is 1001 and the divisor is 110, find the
dataword. [8]

SECTION II

- Q.7 a) Write short notes on any three of the following. [18]
i) PSTN
ii) Frame relay
iii) ATM adaption layer
v) Cellular telephony

OR

- Q.8 a) Compare different DSL technologies. Explain any one in detail. [10]
b) Explain MAC sublayer frame format in standard Ethernet. [8]
Q.9 a) Explain circuit switching and packet switching. [8]
b) Explain wave propagation and its effects on data communications [8]
with examples.

OR

- Q.10a) Explain the following network components [8]
i) connectors ii)repeaters iii)switches iv)Bridges
b) Explain wireless transmission waves in detail. [8]
Q.11 a) How does pure ALOHA prevent congesting the channel? Explain [8]
in detail.
b) What are the factors affection the window size in sliding window [8]
protocol? Explain with example.

OR

- Q.12a) A slotted ALOHA network transmits 200-bit frames using a shared [8]
channel with a 200-kbps bandwidth. Find the throughput if the system
(all stations together) produces
a) 1000 frames per second.
b) 500 frames per second.
c) 250 frames per second.
b) Describe the frame format of frame relay frame. Explain the use of [8]
FECN, BECN, DE bit.