

**CSC 435/524 Computer Networks**  
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**Sample Questions for Module 3 - Physical Layer**

- 1) What is the difference between the bit rate and baud rate and how they are related? If the baud rate of a signal is 4,000 and the number of signal levels used is 18, calculate the bit rate.
- 2) Why can't there be channels of infinite bandwidth? Explain.
- 3) Draw the waveform diagram to send the bit pattern 0 1 1 0 1 1 0 according to: (i) RS-232 standard and (ii) Manchester encoding.
- 4) With respect to the encoding criterion, what is the difference between the RS-232 standard and the Manchester encoding standard?
- 5) Determine the transmission delay, propagation delay and the total delay incurred to transmit data of size 2000 characters using the RS-232 standard. Assume the channel bandwidth is 40000 bits/sec and length is  $2 \times 10^6$  m. Assume the speed of the signal on the channel is 60% of the speed of light.
- 6) Consider the word 'ANT' with the ASCII values of 'A', 'N' and 'T' being 65, 78 and 84 respectively. How would this word be transmitted if the transmission order is:
  - a. Byte little-endian and bit big-endian
  - b. Byte little-endian and bit little-endian
  - c. Byte big-endian and bit big-endian
  - d. Byte big-endian and bit little-endian
- 7) Consider a modulator-demodulator hardware that uses amplitude modulation to encode and decode every cycle of a carrier wave of amplitude A. Draw the waveform diagram to show a modulated carrier wave that is used to transmit the bit sequence 01100111. Assume you are encoding using 4 different amplitude levels. Show clearly, the bit pair you are encoding for each of the 4 amplitude levels.
- 8) Consider a modulator-demodulator hardware that uses frequency modulation to encode and decode a carrier wave for every two cycles. Draw the waveform diagram to show a modulated carrier wave that is used to transmit the bit sequence 0 1 \_ 1 \_ 0. The \_ indicates the channel is idle. Assume one bit is transferred per frequency level. Clearly indicate the number of cycles you are using to send bit 1 and bit 0.
- 9) Use two phase shift keying to encode and decode a carrier wave for every one cycle. The sequence of bits you want to transmit is 0 1 \_ 1 \_ 1 \_ 0. The \_ indicates the channel is idle. Clearly indicate the two phase shifts you are using to encode bits 1 and 0.
- 10) Differentiate between baseband and broadband technologies. Give an example for each of them. What is the advantage of statistical multiplexing compared to FDM/ TDM?
- 11) Assume two computers are using TDM to take turns in sending 512 bytes of data packets over a shared channel that operates at 56 Kbps. If the hardware takes 50msec after one computer stops sending before the other can begin, how long it takes for each computer to send 1 MB of a file?
- 12) Use Code Division Multiplexing to transmit the data values 0 1 1 0 and 1 0 1 0 from two senders S1 and S2 respectively. The 2-bit Chip Sequence of S1 and S2 are 0 1 and 1 1 respectively.
  - a. Show the resulting signal values when the two above two data signals are transmitted simultaneously
  - b. Show how the receiver for the data signals sent by S1 and S2 are able to decode the data?