1. 1> Baud rate and data rate could be used interchangeably because their meanings are equivalent.

True\_ False\_

And explain:

ADSL uses base band for transmission of signals.

True \_False\_

And explain:

1. Describe in details at least four critiques of the OSI MODEL and its protocols.
2. a> If a 16-level signal is sent over a 100KHz channel whose SNR=37dB what is the maximum achievable data rate? Show all your work.

b> Explain why Fourier Analysis is one of the most important theoretical basis for data communications. There is no need to give me the formula. Just explain in your own wording.

1. List and explain the four methods of framing in the data link layer. Then describe a disadvantage of each of methods.
2. We have a simplistic broadcast subnet. Suppose that time is divided into discrete slots, with each host of the n hosts attempting to use the channel with probability p during each slot.
3. What fraction of the slots is wasted due to inactivity?
4. What fraction of the slots is used for successful transmissions?
5. Given the bit stream below, draw the line codes for NRZ, NRZI, Manchester and Bipolar encoding.
6. Draw the signals in the table below.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bit stream | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| NRZ |  | | | | | | | |
| NRZI |  | | | | | | | |
| Manchester |  | | | | | | | |
| Bipolar |  | | | | | | | |

1. Which signal shown has the lowest frequency? Explain why.
2. Multiplexing
3. Explain the differences among TDM, FDM and CDM.
4. Given the chip sequences of four station, E,F,G and H:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| F | -1 | 1 | -1 | 1 | -1 | 1 | -1 | 1 |
| G | -1 | -1 | 1 | 1 | -1 | -1 | 1 | 1 |
| H | 1 | 1 | 1 | -1 | -1 | -1 | 1 | -1 |

Show me if the chip sequences are valid. Explain why yes or no.(Hint: orthogonal property)

1. Another set of stations (Station A,B,C and D) are transmitting. A CDMA receiver gets the following chips: (0 -2 +2 0 +2 +2 0 0). **Show me which stations transmitted, and which bits each station sent.** The chip sequences for station A,B,C and D are listed as follows:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A | -1 | -1 | -1 | 1 | 1 | -1 | 1 | 1 |
| B | -1 | -1 | 1 | -1 | 1 | 1 | 1 | -1 |
| C | -1 | 1 | -1 | 1 | 1 | 1 | -1 | -1 |
| D | -1 | 1 | -1 | -1 | -1 | -1 | 1 | -1 |