Quiz of L4 - Modulation

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1. What is the definition of modulation?
   Modulation is a process of varying properties of the carrier signal with the modulation signal. The properties include amplitude, frequency or phase. The modulation signal contains the information to be transmitted. The carrier signal is a periodic waveform that usually has higher frequency than the modulation signal.

2. There are multiple modulation algorithms available for sending a given bit stream. Yes or No?
   Yes. (BPSK, QPSK, 8PSK...)

3. Assume that the symbol duration is T. If a modulation scheme embeds M bits in a symbol, what is the data rate of this modulation scheme?
   $\frac{M}{T}$ bits per second (or whatever the unit of T is)

4. How many unique patterns should we have if we want to embed M bits in a symbol?
   2^M unique patterns

5. Explain briefly what is the difference between

   - PSK(phase-shift keying)
     1. Convey data by changing phase of carrier wave
     2. Vulnerable to phase noise and interference
   - FSK (frequency-shift keying)
     1. Convey data by changing frequency of carrier wave
     2. Require a wider bandwidth
   - ASK (amplitude-shift keying)
     1. Convey data by changing amplitude of carrier wave
     2. Vulnerable to noise and attenuation, but simpler to implement