

## Data Communications

### Sample Questions

1. Assume a frame with the following content is given, Use the polynomial  $X^4+X^3+x+1$  to find its CRC code.  
Frame data: 11100010100011  
[Follow the sample given in week 8 slides](#)
2. Find the hamming error correction code-word for data 11100010  
[Use error correction using multiple parity bits discussed in week 8 lecture](#)
3. Assume data is given as A123B7D89701CC09. Find the checksum (use 16 bit fields)  
[Example can be found in lecture 8](#)
4. In a network using ALOHA for medium access control, we have frames arriving as shown below. Draw a diagram displaying the data transmission by each host and determine where we have collisions
  - a. Host 1: Sends at  $t=2$ , duration 3
  - b. Host 2: sends at  $t=5$ , duration 4
  - c. Host 3; Sends at  $t=7$ , duration 1[Draw the host versus time diagram. If there is any overlap in the transmission time of two or more hosts then there is a collision there](#)
5. Explain how carrier sensing is carried out in 1-persistent protocols  
[1-persistent algorithm is explained in week 9 slides](#)
6. Explain how collisions are avoided by using switches in LANs  
[Review week 12 slides](#)
7. What is the learning property of a bridge?  
[Review week 12 slides](#)
8. Why loops should be prevented in a LAN with multiple bridges? How do we remove loops?  
[Review week 12 slides](#)
9. How is energy saving is performed in wireless networks with infrastructure? Explain TIM messages  
[Wireless networks turn off their NIC for energy saving. The station turn on their NIC in fixed intervals. TIM and ATIM messages are used to keep them awake when there is a message pending for delivery to a station. Check slides of week 13](#)
10. Why do we use 4 addressing in IEEE 802.11 frames?  
[The frame transmission in wireless networks has three stages: Station to AP, AP to AP and AP to station. Four addresses are needed to identify the original sender, original receiver, current sender, and current receiver. Check slides of week 13](#)
11. How fragmentation is handled in IEEE 802.11 protocol?  
[RTS/CTS/ACK messages include the transmission time of frames, and request for its extension. All stations mark their NAV as busy. \(Week 13\)](#)
12. What are RTS/CTS messages?  
[Request to send, clear to send messages for medium access control \(week 13 slides\)](#)

13. Ethernet defines a max network length for detecting collisions. How can we relate network length to the collision detection?

Ethernet does not want to let collisions go undetected. Hence the sender should have enough time for receiving a collision signal before a transmission terminates. (week 10)

14. How Fast Ethernet encodes data when cat.3 twisted pair wires are used?

Week 10 slides

15. What are the differences between go-back-n and sliding window algorithms? Give an example

Week 9 (Sliding window)

16. Digital Phase Lock Loop (DPLL) is used in a network for synchronization. Assume a transition happens when the counter value is 10. How DPLL will make corrections?

Week 7 (synchronization)

17. If the TxC is 1000 Hz and the RxC is 8000 Hz, what is the max deviation percentage in this network?

Week 7 (synchronization)

18. Different propagation rate at different frequencies may cause inter-symbol interference. Explain.

Propagation delay is a function of frequency. Hence some components may arrive with longer delay and hence overlap with the next bit. This is called inter-symbol interference. (week 3, distortion)