Review and Study Questions for the Data link Layer
Data Communications – Dr. John Gorgone

1. What is the main goal of the data link layer?

2. What are the goals of the data link control layer?

3. What are the data link control functions? That is, what are the requirements and objectives for effective data communications between directly connected transmitting – receiving stations?

4. What is the relationship of the data link control protocols to network architectures? That is, how are they used within the network architectural structures?

5. What are three characteristics that distinguish various data link configurations? Name and define each.

6. Draw, label, and explain each of the most common data link configurations (a combination of topology and duplexity) using a single primary station (P) and one or more secondary (s) stations.

7. A number of combinations of topology and duplexity are possible in data link configurations for multi-point links. There are three possible data link configurations. Name and define each of them.

8. There are three distinct phases of communications control procedure. These three phases, in some form, are a part of all line discipline for point-to-point and multi-point links. Name and describe the three phases.

9. The choice of line discipline for multi-point links depends primarily on whether there is a designated primary station or not. The most common line disciplines used in multi-point links are: A) roll-call polling; B) Hub polling; C) Select; D) Fast Select; and E) contention. Define and explain each.

10. Define flow control. What is the name of the simplest form of flow control? What is the name of a more elaborate flow control procedure?

11. Explain Stop-and-wait protocol. What is the purpose of the time out?
12. Explain the operation of the sliding window protocol.


14. Explain the three versions of ARQ that are in popular use (stop-and-wait ARQ; go-back-N continuous ARQ; and selective-repeat continuous ARQ). What is the purpose of the time out?

15. Define Piggybacking. Why is it used?

16. Bit-oriented protocols are designed to satisfy a wide variety of data link requirements and objectives. What four objectives do the bit-oriented protocols satisfy? Name and explain each.

17. A number of very similar bit-oriented protocols have achieved widespread use today. Name and explain each.

18. What does HDLC mean?

19. Is HDLC a bit or a byte-oriented protocol?

20. Who developed HDLC (what organization)?

21. What are the basic characteristics of HDLC? In other words, HDLC defines three types of stations, two link configurations and three data transfer modes of operation. Name each of them.

22. HDLC transmissions are in frames and a single frame format suffices for all types of data and control exchanges. Draw the HDLC frame and label each field, indicating the appropriate number of bits per field.

23. HDLC has a single frame format that serves for all types of data and control exchanges. However, there are three types of frames. Draw and name each type. Also, label each bit or group of bits and define their function.

24. Define bit stuffing. What is its purpose? Give an example of bit stuffing.

25. Define each of the following terms: RR RNR, REJ, and SREJ. In what type of HDLC frame are these functions found?

26. In addition to HDLC, name three other types of protocol standards.

27. In HDLC, the I-frame contains a P/F bit. What do the P and F
bit mean and how are they used? How is the P/F bit used in normal response mode?

29. In HDLC, certain frames are used for a variety of control functions. These frames do not carry sequence numbers and do not alter the sequencing or flow of numbered frames. What is the name of these frames? What are the names of the four categories into which they may be grouped?

30. Why is it unnecessary to have a NAK0 and NAK1 for the stop-and-wait ARQ?

31. Assume that the primary HDLC station in NRM has sent six I-frames to a secondary. The primary’s N(S) count was three (011 binary) prior to sending the six frames. If the poll bit is on in the sixth frame, what will be the N(R) count back from the secondary after the last frame, assuming an error-free transmission?

32. When using go-back-N ARQ procedure with a 3-bit sequence number, what is the maximum allowable number of outstanding frames and why?

33. When using a selective repeat ARQ with a 3-bit sequence number, what is the maximum allowable number of outstanding frames and why?