

Sample Questions from Module-2

Error Control

1. Explain the CRC error detection technique using generator polynomial X^4+X^3+1 and data 11100011.
2. What is the need of CRC in Frame? Explain
3. Write the steps to generate the Hamming Code. Prepare Hamming code for bit pattern 1110. Suppose while transmitting, error occurs in sixth bit, write the bit pattern at the receiver. Using hamming code, explain how you will detect the error.

Flow Control

1. Frames of 1000 bits are sent over a 1-Mbps channel using geostationary satellite whose propagation time from the earth is 270msec. Acknowledgement are always piggybacked on to data frames. The headers are very short. Three bits sequence numbers are used. What is the maximum channel utilization for
 - a. Stop and Wait
 - b. Go back N
 - c. Selective repeat
2. Explain with the help of example, the reason for moving from the Stop-and-Wait ARQ Protocol to Go-back-N ARQ Protocol. Define Piggybacking and its usefulness.
3. Given the use of 100 bits frames on a 1 Mbps satellite channel. What will be the maximum Link utilization for
 - a. Stop and Wait
 - b. Continuous ARQ with window size 127.
 - c. Continuous ARQ with window size exactly equal to sequence number that uses 5 bits.
4. Channel has a bit rate of 4 kbps and propagation delay of 20 ms. For what range of frame sizes does stop and wait give an efficiency of at least 50 percent?
5. Explain function of timer in flow control. Discuss different scenarios.

Network Layer:

1. Identify the class and default subnet mask of the IP address 217.65.10.7
2. A class B network on internet has a subnet mask of 255.255.240.0. What will be the maximum number of hosts per subnet?

3. What will be the subnet address if the destination address is 200.45.34.56 and subnet mask is 255.255.240.0?
4. Find the net id and the host id of the following IP addresses:
 - a. 114.34.2.8 (IV) 110.34.56.78
 - b. 132.56.8.6 (V) 172.16.19.65
 - c. 208.34.54.12
5. An ISP is granted a block of addresses to GLA University starting with 170.80.60.0/24. The GLA University wants to distribute these blocks to four colleges as follows.
 - a. The Academic Building-1 has 28 Labs, each need 60 addresses.
 - b. The Academic Building-2 has 30 Labs; each needs 50 addresses.
 - c. The Academic Building-3 has 18 Labs; each needs 34 addresses.
 - d. The Academic Building-4 has 28 Labs; each needs 44 addresses.

Design the subblocks and find out how many addresses are still available after these allocations.
6. Compare IPv4 and IPv6.
7. What do you mean by fragmentation? Explain why we need this.
8. Explain about IPv4 header.
9. Numerical Questions from Frouzan 5th edition (page no 558) P. No1-12. (classful and classless)
10. Theory Questions from Frouzan 5th edition (page no 592) Q. No. 1 to 10. (IPv4 header)
11. Numerical Questions from Frouzan 5th edition (page no 593) P. No. 1, 2, 6, 7, 8 to 10. (IPv4 header)
12. Theory Questions from Frouzan 5th edition (page no 633 and 634) Q. No. 2- 19

Transport Layer

1. Assume we have a set of dedicated computers in a system, each designed to perform only a single task. Do we still need host-to-host and process-to-process communication and two levels of addressing?
2. Operating systems assign a process number to every running application program. Can you explain why these process numbers cannot be used instead of port numbers?
3. Assume you need to write and test a client-server application program on two hosts you have at home.
 - a. What is the range of port numbers you would choose for the client program?
 - b. What is the range of port numbers you would choose for the server program?
 - c. Can the two port numbers be the same?

4. Can you explain why some transport-layer packets may be received out of order in the Internet?
5. In the Go-Back-N protocol, the size of the send window can be $2^m - 1$, while the size of the receive window is only 1. How can flow control be accomplished when there is a big difference between the size of the send and receive windows?
6. Numerical Questions from Frouzan 5th edition (page no 730 and 731) Q. No. 3, 4, 5, 19, 20, 21.
7. Theory and practice questions from Frouzan 5th edition (page no 806, 807 and 808) Q. No. 1 to 34.
8. Numerical questions from Frouzan 5th edition (page no 809, 810 and 811) Q. No. 1 to 15.
9. Distinguish between a time-out event and the three-duplicate-ACKs event. Which one is a stronger sign of congestion in the network? Why?
10. Read congestion control (page no 777 to 781).

Application Layer (For this portion refer 4th edition frouzan)

1. Describe the HTTP application layer protocol with neat header diagram
2. FTP uses two TCP connections. Describe each connection and their uses.
3. What do you mean by persistent and non-persistence connection?
4. What do you mean by static and dynamic web pages?
5. What is the use of UA and MTA in mail transmission? Describe mail transfer protocol for various scenarios. Explain the use of IMAP and POP.
6. Why Name Servers are organized in hierarchy? What are the different resource records existing in DNS database?
7. Define the DNS resolver. Describe Iterative and Recursive resolver.
8. Numerical question from Frouzan 5th edition (page no 924) Q. No. 10, 16, 17

Cryptography (For this portion refer 4th edition frouzan)

1. With the help of block diagram, explain the symmetric key cryptography. State advantages and drawbacks of symmetric key cryptography.
2. Discuss asymmetric cryptography.
3. Discuss RSA algorithm (refer page no. 949 4th edition). Example 30.7 and 30.8.