nester IV (B.Tech.)

Number of printed pages: 01
Er. No. 20183098
Academic Year: 2021-22

# Jaypee University of Engineering & Technology, Guna

## T-2 (Even Semester 2022)

## 18B11CI411 – COMPUTER NETWORKS

Maximum Duration: 1 Hour 30 Minutes

Maximum Marks: 25

Notes:

1. This question paper has **five** questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

| | | | Marks |
|---|---|---|---|
| Q1. | (a) | What is the need of flow control? Explain the common approaches for flow control in data link layer. | [03] |
| | (b) | A bit string 0111101111101111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? | [02] |
| Q2. | (a) | In a slotted ALOHA network with G=1/2, how is the throughput affected in each of the following cases?<br>(i) G is increased to 1 (ii) G is decreased to 1/4 | [03] |
| | (b) | A path in a digital circuit-switched network has a data rate of 1Mbps. The exchange of 1000 bits is required for the setup and teardown phases. The distance between two stations is 5000 km and propagation speed is $2 \times 10^8$ m/s. Determine the total delay if 100,000 bits of data are exchanged during the data transfer phase. | [02] |
| Q3. | (a) | Describe the working principle of carrier sense multiple access with collision detection (CSMA/CD). | [03] |
| | (b) | In Stop-and-Wait ARQ system, the bandwidth of the line is 2 Mbps, and 2 bits take 40 ms to make a round trip. What is the bandwidth-delay product? If the system data frames are 2000 bits in length, what is the utilization percentage of the link? | [02] |
| Q4. | (a) | Using 5-bit sequence numbers, what is the maximum size of the send and receive windows for each of the following protocols?<br>(i) Stop-and-Wait ARQ (ii) Go-Back-N ARQ (iii) Selective-Repeat ARQ | [03] |
| | (b) | Given the data-word 1010011110 and the divisor 10111,<br>(i) Show the generation of the CRC codeword at the sender site.<br>(ii) Show the checking of the codeword at the receiver site (assume no error). | [02] |
| Q5. | (a) | Discuss the digital to analog conversion techniques with the help of suitable waveforms. | [03] |
| | (b) | A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minute with each frame carrying an average of 10,000 bits. What is the throughput of this network? | [02] |