

**VIT**

Vellore Institute of Technology

Chennai 605 019, India

**School of Information Technology and Engineering****Fall Semester 2022-2023****Continuous Assessment Test – II**

Programme Name &amp; Branch: MCA

Course Name &amp; code: Data Communication and Networking &amp; ITA5003

Class Number (s): VL2022230105117, VL2022230105122, VL2022230106227

Slot: E2+TE2

Faculty Name: Prof K.Santhi, Prof T Senthil Kumar, Prof M Ramalingam

Exam Duration: 90 Mins.

Maximum Marks: 50

**Answer all the questions**

| Q.No. | Question   | Max Marks |
|-------|--|-----------|
| 1.    | <p>A path in a digital circuit-switched network has a data rate of 2 Mbps. The exchange of 100 bits is required for the setup and teardown phases. The distance between two parties is 500 km.</p> <p>Answer the following questions if the propagation speed is <math>1 \times 10^8</math> m/sec:</p> <p>a. What is the total delay if 100 bits of data are exchanged during the setup phase?</p> <p>b. What is the total delay if 10,000 bits of data are exchanged during the data-transfer phase?</p> <p>c. What is the total delay if 1,00,000 bits of data are exchanged during the data-transfer phase?</p> <p>d. Find the delay per 100 bits of data for each of the above cases and compare them. What can you infer?</p> | 10        |
| 2.    | <p>i) A sender needs to send the four data items 3456, ABCC, 02BC, and EEEE. Answer the following:</p> <p>a. Find the checksum at the sender side</p> <p>b. Find the checksum at the receiver side if there is no error.</p> <p>c. Find the checksum at the receiver side if the second data item is changed to ABCE.</p> <p>d. Find the checksum at the receiver side if the second data item is changed to ABCE and the third data item is changed to 02BA. (8 marks)</p>  | 10        |

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|----|---|----|
|    | <p>ii) What is the Hamming distance for each of the following codewords?</p> <p>a. <math>d(10000, 00000)</math><br/> b. <math>d(10101, 10000)</math><br/> c. <math>d(11111, 11111)</math><br/> d. <math>d(000, 000)</math> (2 marks)</p>  |    |
| 3. | <p>i) Draw the sender and receiver windows for a system using Go-Back-N ARQ for the following:</p> <p>a. Frame 0 is sent; frame 0 is acknowledged.<br/> b. Frames 1 and 2 are sent; frames 1 and 2 are acknowledged.<br/> c. Frames 3, 4 and 5 are sent; frame 4 is acknowledged; timer for frame 5 expires.<br/> d. Frames 5, 6 and 7 are sent; they are lost. (5 marks)</p> <p>ii) A receiver receives the code 11001100111. When it uses the Hamming encoding algorithm, the redundancy bits is 0101. Which bit is in error? What is the correct code? (5 marks)</p> | 10 |
| 4. | <p>i) Given the dataword 1010011110 and the divisor 10111.</p> <p>(i) Show the generation of the codeword at the sender side using binary division.<br/> (ii) Show the checking of the codeword at the receiver site (assume single bit error). (5 marks)</p> <p>ii) A slotted ALOHA network transmits 300-bit frames on a shared channel of 100 kbps. What is the throughput produced by the system (all stations together)? (5 marks) <i>for 1000 frames</i></p>  | 10 |
| 5. | <p>i) In Selective Repeat protocol, suppose frames through 0 to 5 have been transmitted. Now, imagine that 0 times out of 6 (a new frame) is transmitted, frame 1 ack received, frame 2 lost and new frames 7, 8, 9, 10 are transmitted.</p> <p>At this point, what will be the outstanding series of packets in sender's window? (5 marks)</p> <p>ii) Assume a sender sends 6 packets: packet 0, 1, 2, 3, 4 and 5. The sender receives an ack with ackno.3. Draw the sender receiver window using Go Back N &amp; Selective Repeat protocols. (5 marks)</p>            | 10 |