**BRAC UNIVERSITY**

**Department of Computer Science and Engineering**

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| Examination: Semester Final  Duration: 1 Hour 45 min | Semester: Fall 2022  Full Marks: 40 |
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CSE 320: Data Communications

Answer the following questions.

Figures in the right margin indicate marks.

**SET B**

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| **1. [CO3]** | a) | **Explain** how DSSS achieves bandwidth spreading and privacy in brief.  Suppose, you are given with the k-bit pattern and Carrier Frequency as follows:  **k-bit pattern**   |  | | --- | | 11 10 00 01 |  |  |  | | --- | --- | | **k-bit** | **Carrier Frequency** | | 10 | 450kHz | | 11 | 250 kHz | | 01 | 150 kHz | | 00 | 350 kHz |   **Draw** FHSS cycle 3 times using the above pseudo random generated k-bit pattern and given frequency table. (\*\* Hint: Draw the Carrier frequency graph against hop period) | 2+4 |
| **[CO5]** | b) | **Identify** the name of the media access protocols for following list of scenarios**:**   1. each station is forced to send only at the beginning of the time slot. 2. stations use different codes to achieve multiple access 3. a station transmits its data in its assigned time slot only. 4. the stations are organized in a logical ring | 4 |
| **2. [CO2]** | a) | **Show** the staircase in the following graph and generate the digital data from the given analog signal using the Delta Modulation (DM) technique.  You have to answer this question in the question paper only. | 6 |
| **[CO4]** | b) | **Compare** between the above figures and write three disadvantages of both cable types. | 4 |
| **3. [CO3]** | a) | **Consider**, you are a maintenance engineer of a networking company at Rupganj. Your company multiplexes 5 channels where each of them sends 50 pages per second. Each page consists of 200 characters. if 5 characters at a time are to be multiplexed using the concept of TDM with 1 synchronizing bit, then answer the following questions:   1. What is the input data rate for each of the connections? 2. What is the input bit duration? 3. What is the frame rate? 4. What is the duration of a frame? 5. What is the output data rate? 6. What is the output bit duration? | 6 |
|  | b) | In the above scenario, suddenly one of the 5 channels started sending data at the rate of 48 pages per second. As an engineer, what will be your solution? Drawand **validate** with visual representation. | 4 |
| **4. [CO5]** | a) | Suppose you want to transmit the message x9 +x8 + x5+x4 + x + 1 and protect it from errors using the CRC generator polynomial x3 +x+ 1. Using binary division, **show** the message that should be transmitted.  Later, corrupt the right-most fifth bit of the transmitted message and show that the error is detected by the receiver using CRC technique. | 6 |
|  | b) | **Classify** the medium access protocols which are collision-free. Why is the efficiency of pure ALOHA halved of slotted ALOHA technique? | 4 |

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