

UNIVERSITY OF BARISHAL  
 Department of Computer Science and Engineering  
 Mid-term Examination, 2<sup>nd</sup> Semester, 2<sup>nd</sup> Year, Admission Session: 2022-23  
 Course Title: Data Communication, Course Code: CSE-2205

Time: 1-hour

Full Marks: 25

(Answer all of the following questions)

1. Explain why collision is an issue in random access protocols but not in controlled access protocols. 3
2. Assume the propagation delay in a broadcast network is  $5\mu\text{s}$  and the frame transmission time is  $10\mu\text{s}$ .
  - a. How long does it take for the first bit to reach the destination?
  - b. How long does it take for the last bit to reach the destination after the first bit has arrived?
  - c. How long is the network involved with this frame (vulnerable to collision)?
3. List some strategies in CSMA/CA that are used to avoid collision. 3
4. Alice and Bob are experimenting with CSMA using a  $W_2$  Walsh table (see the following Figure). Alice uses the code  $[+1, +1]$  and Bob uses the code  $[+1, -1]$ . Assume that they simultaneously send a hexadecimal digit to each other. Alice sends  $(6)_{16}$  and Bob sends  $(B)_{16}$ . Show how they can detect what the other person has sent. 5

$$W_1 = \begin{bmatrix} +1 \end{bmatrix}$$

$$W_{2N} = \begin{bmatrix} W_N & W_N \\ W_N & \overline{W_N} \end{bmatrix}$$

$$W_2 = \begin{bmatrix} +1 & +1 \\ +1 & -1 \\ +1 & -1 \\ +1 & +1 \end{bmatrix}$$

$$W_4 = \begin{bmatrix} +1 & +1 & +1 & +1 \\ +1 & -1 & +1 & -1 \\ +1 & +1 & -1 & -1 \\ +1 & -1 & -1 & +1 \end{bmatrix}$$

a. Two basic rules

b. Generation of  $W_2$  and  $W_4$

5. What is the relationship between the Van Allen belts and satellites? 2
6. Compare an uplink with a downlink. 2
7. When we make a wireless Internet connection from our cellular phone, do we use fixed or mobile WiMAX? Explain. 3
8. What is GSM? 3

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