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# Faculty of Engineering Technology

# Mid-Term Examination Question Paper – B.Tech

**Department : Computer Science and Engineering**

**Programme : B.Tech in Computer Science and Engineering**

**Semester / Batch : 5th / 2019**

**Date of Test : 12th November 2021**

**Course Code : 19CSC303A**

**Course Title : Computer Networks**

**Mid-Term Exam**

**INSTRUCTIONS TO STUDENTS:**

1. **The first two questions (Questions 1 and Questions 2) are compulsory**
2. **Answer any two full questions from Question 3, Question 4 and Question 5**
3. Use of non-programmable scientific calculator is permitted
4. Use of data handbook permitted wherever applicable
5. Missing data may be appropriately assumed
6. Notations used have usual meaning

**Maximum Duration: 2 hours Maximum Marks: 50**

|  |  |  |  |
| --- | --- | --- | --- |
| **Q. No.** | **Question** | **Marks** | **CO\*** |
| **1.** | 1. In case of congestion, \_\_\_\_\_\_\_\_\_ packets are used to reduce the transmission rate.    1. Jamming    2. Choke    3. Jitter    4. Error 2. \_\_\_\_\_ is NOT carried out by the Network Layer.    1. Internetworking    2. Host to host delivery of packets    3. Routing    4. Access control 3. Protocol characterized by least number of collisions is \_\_\_\_\_\_.    1. CSMA-CA    2. CSMA    3. Pure ALOHA    4. Slotted ALOHA 4. The number of transceivers used in Fiber to Kerb method for N users is \_\_\_\_.    1. 2N    2. 2N+2    3. 2    4. 2N+1 5. Bridge is present in \_\_\_\_\_\_ layer of the OSI Model.    1. Physical    2. Data Link    3. Network    4. Transport | **05** | **1,2** |
| **2** | Discuss the classification of network based on scale and transmission technology. | **05** | **2** |
| **3** | 1. Differentiate between OSI and TCP/IP Network Software Architecture models. | **06** | **4** |
| 1. Discuss any two guided media transmissions in computer networks. | **06** | **2** |
| 1. Compute the Cyclic Redundancy Check (CRC) for the data set {10010} and the Generator Polynomial x^3+x+1. Check for any error if the received data is {10010011}. | **08** | **2** |
| **4** | 1. Enumerate any two framing techniques in Data Link Layer. | **06** | **1** |
| 1. Discuss the Passive Optical Network (PON) solution with a neat diagram. | **06** | **2** |
| 1. Compare the operation of Leaky Bucket and Token Bucket traffic shaping algorithm. | **08** | **2** |
| **5** | 1. Discuss any two Collision Free protocols in Medium Access Control (MAC) Layer. | **06** | **4** |
| 1. Consider an application that prioritizes real-time transfer of data over reliability. 2. Identify the ideal network layer service for such an application. 3. Enumerate the characteristics of the identified service. | **06** | **3** |
| 1. Enumerate the importance of inter-frame spaces in CSMA-CA and explain the types of inter-frame spacing in IEEE 802.11. | **08** | **2** |

**\*CO –** Course Outcome

|  |  |
| --- | --- |
| Course Outcomes | |
| 1 | Describe the protocols that operate in the TCP/IP stack and wireless networks |
| 2 | Explain the principles of computer networks, their protocols and security considerations |
| 3 | Choose appropriate network protocols for given applications |
| 4 | Analyse and compare different wired and wireless network protocols |
| 5 | Design and synthesize client‐server based computer networks using the sockets API |
| 6 | Evaluate the performance of wired and wireless networks using appropriate tools and simulators |

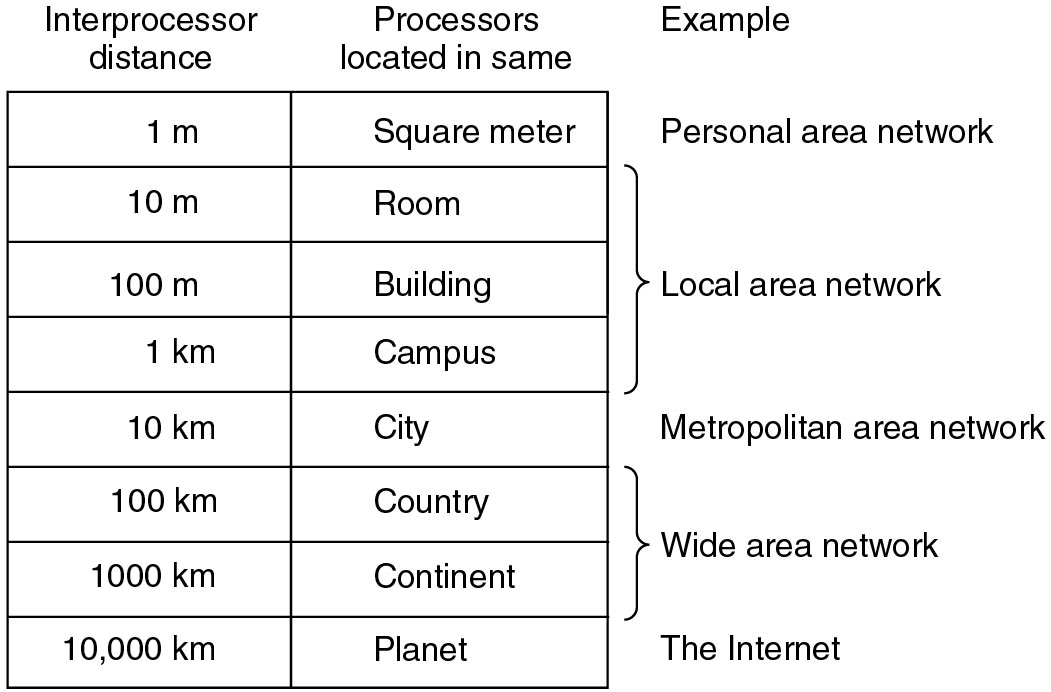
**Scheme and Solution**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Question**  **No.** | Tasks –Steps involved | **Marks Allotted** | **Expected solution** | **Total Allotted Marks for the question** |
| 1. | i) b – Choke  ii) d – Access Control  iii) a – CSMA-CA  iv) c – 2  v) b – Data Link | 5 (1 Mark Each) |  | 10 |
| 2. | Classification of Networks  Based on Scale  Based on Transmission Technology | 6 Marks (4+2) | Appendix - 1 | 20 |
| 3. | a. Differences between OSI and TCP/IP  b. Guided Media Transmission  Explanation of Working Principle and diagram  c. CRC Error Detection  Generation of CRC Code and Checking for errors at the receiver side | 6 Marks  6 Marks  (3 + 3 )  8 Marks  (4 + 4 ) | Appendix-2 | 20 |
| 4. | a. Framing Techniques – Working Principle and diagram  b. PON – Working Principle with diagram  c. Leaky Bucket and Token Bucket Algorithm | 6 Marks  (3 + 3)  6 Marks  (4 + 2)  8 Marks | Appendix - 3  Appendix – 4  Comparison along with diagrams | 20 |
| 5. | a. Collision Free Protocols  b. Connection-less Service  Characteristics of Datagram  c. Importance of Inter-frame Spacing  Types of Inter-frame Spacing | 6 Marks  (3 + 3)  6 Marks  (1 + 5 )  8 Marks  ( 2 + 6 ) | Appendix – 5  Appendix - 6 | 20 |

**Detailed Solution**

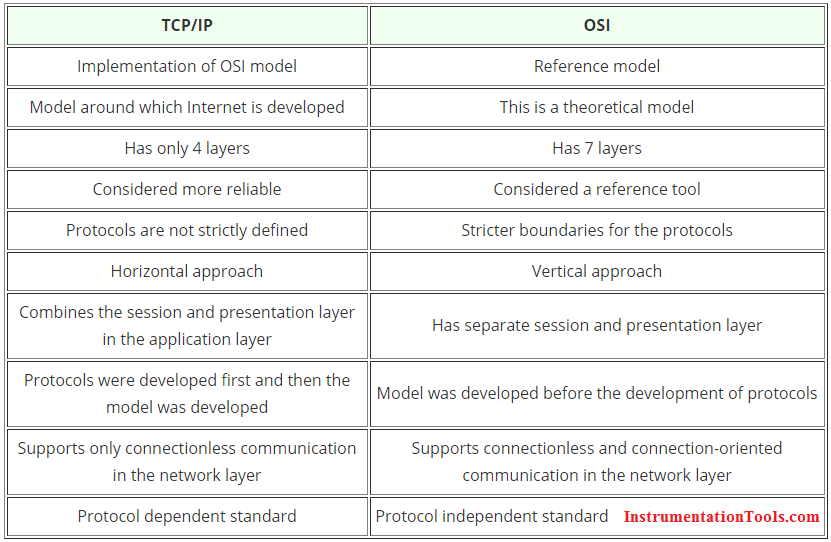
**Appendix – 1**

Based on Scale



Based on Transmission Technology – Broadcast and Point to Point Links

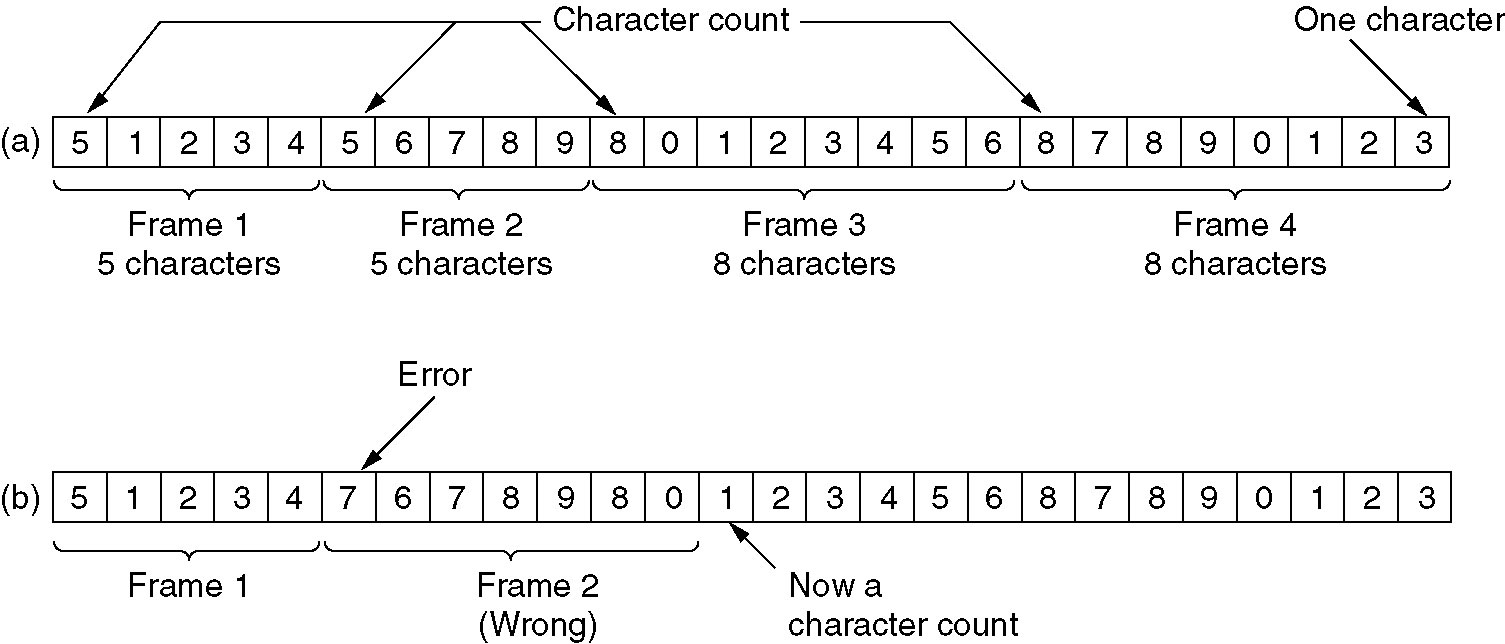
**Appendix – 2**



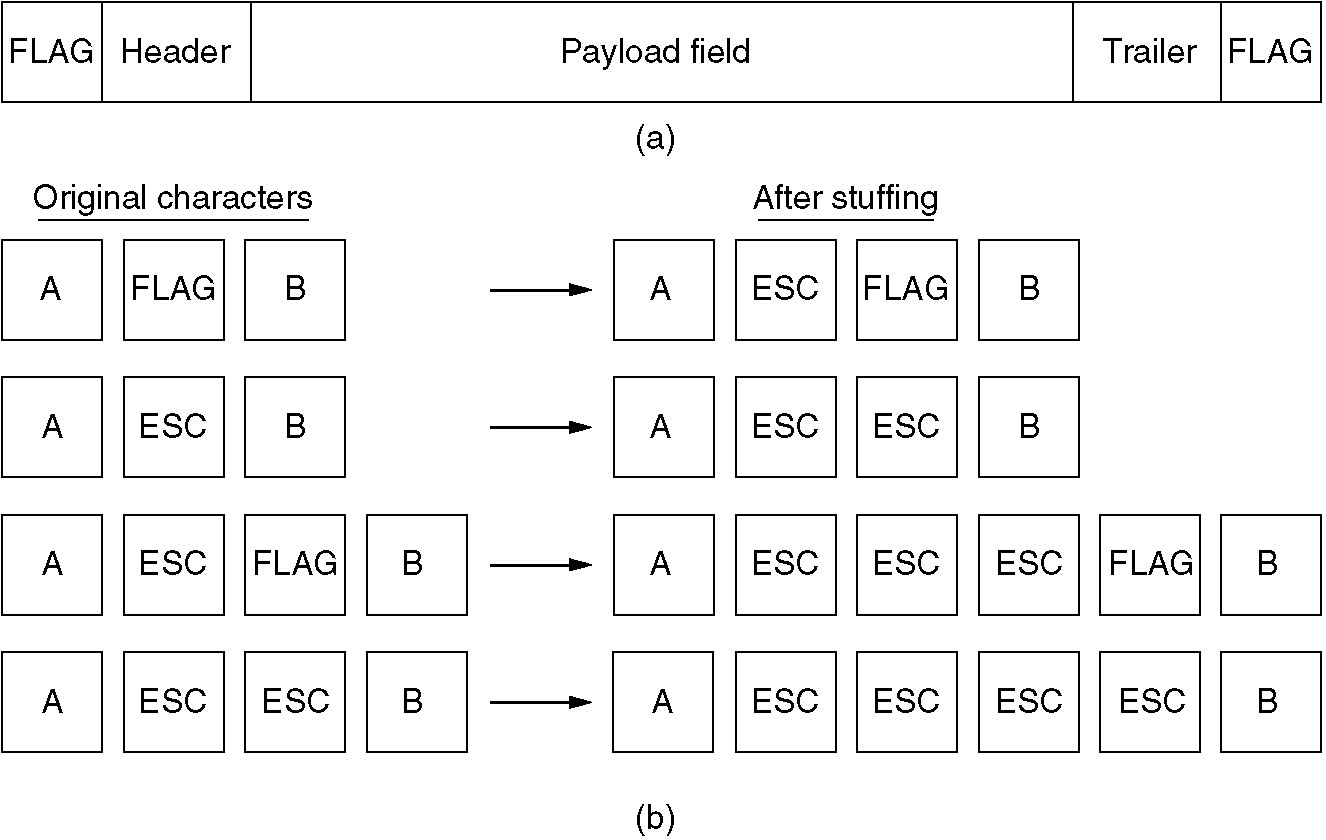
**Appendix – 3**

Framing Technique

Character Count

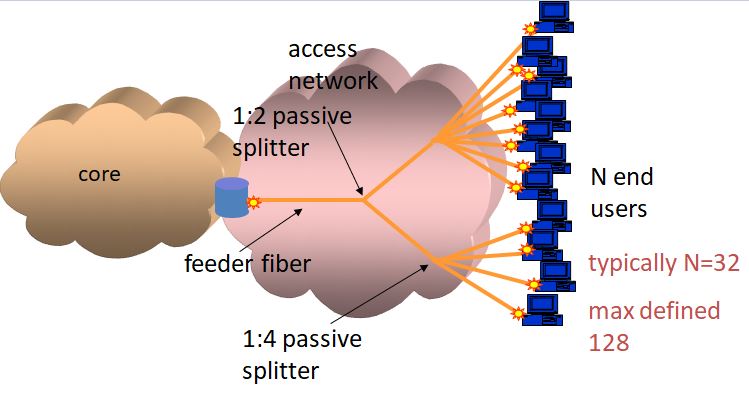


Byte Stuffing



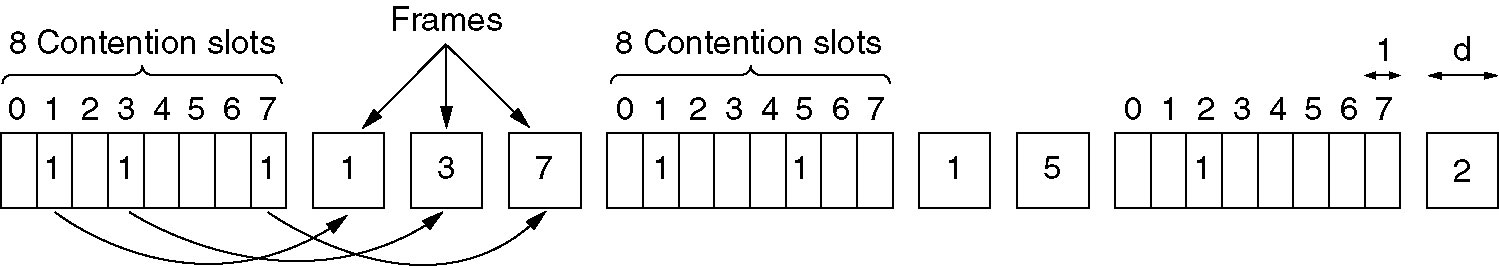
**Appendix – 4**

Passive Optical Networks

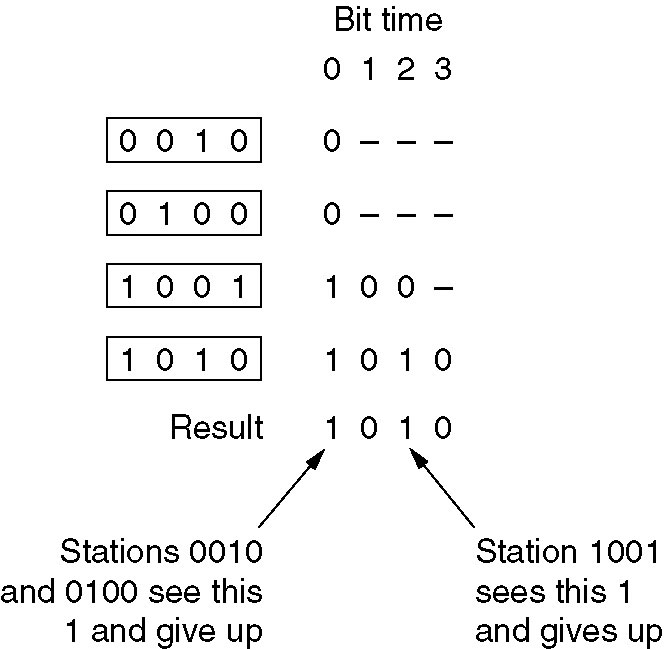
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**Appendix – 5**

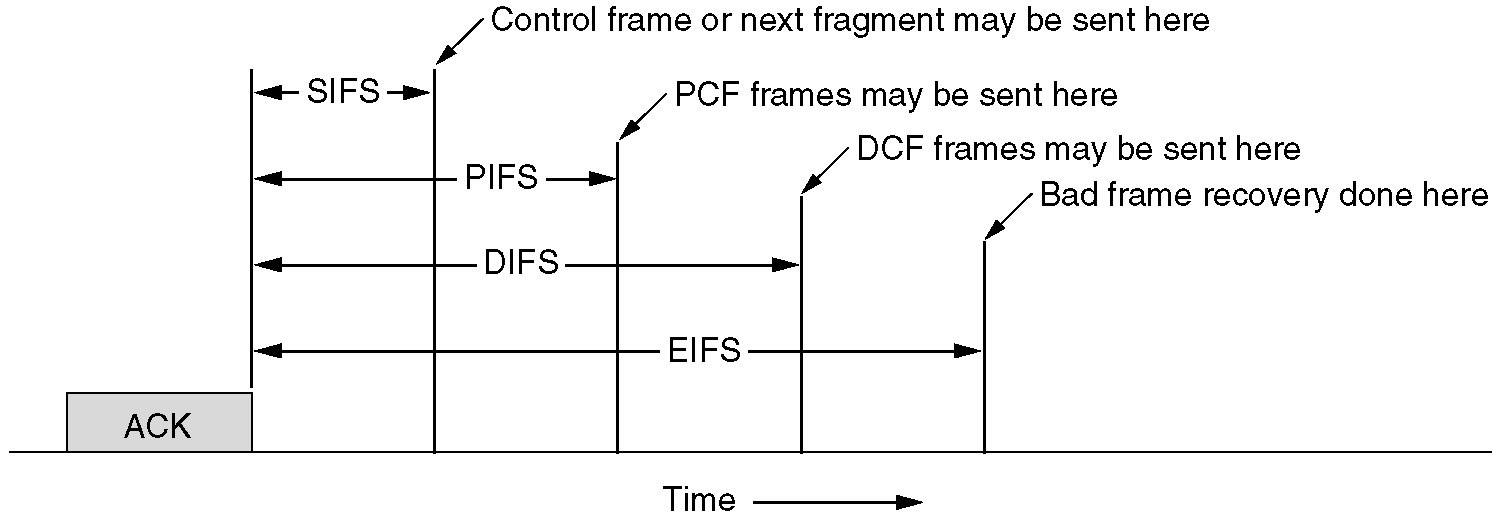
Basic Bit-Map Protocol



Binary Countdown Protocol



**Appendix – 6**

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