

Indian Institute of Engineering Science and Technology, Shibpur
B.Tech CST 6th Semester Mid-semester Examinations, February 2024

Data Communication and Computer Network

CS-3202

Full Marks: 30

Time: 2 hours

*Attempt question 1 and any three from the rest
All parts of the same question must be answered together*

✓ 1. Mandatory Question: Answer the following questions -

✓ (a) Describe briefly the functionality of the following network devices:

(i) Hub, (ii) L2-switch, (iii) Router.

✓ (b) Draw the modulated signal waveform for the bit sequence 0 1 0 0 0 1 0 1 1 0 1 1 1 0 when the Quadrature Amplitude Modulation (QAM) technique is used during modulation.

✓ (c) The following 8 bits '1 1 0 1 1 0 0 1' are to be transmitted using the CRC polynomial $(x^3 + x + 1)$. What is the bit pattern that should be transmitted? Answer with justification.

✓ (d) Explain Pulse Code Modulation (PCM) technique in brief.

[4 + 4 + 4 + 3 = 15]

2. (a) Explain "baseline wandering" and "self synchronization" challenges in line coding technique.

✓ (b) Draw the Manchester and Differential Manchester encodings waveform for the following bit sequence 0 1 0 1 0 1 1 1.

[3 + 2 = 5]

✓ 3. Consider two stations S (sender) and R (receiver) using the selective reject ARQ for error control. Illustrate with examples how the following cases are handled:

- ✓ (i) A data frame sent by S does not reach R
- ✓ (ii) A data frame sent by S reaches R but is corrupted
- ✓ (iii) An ACK frame sent by R does not reach S.

[5]

✓ 4. (a) Explain 'p-persistent CSMA'. Discuss the effects of the choice of the value of 'p' on the performance of p-persistent CSMA.

(b) State the different fields in the Ethernet frame format along with their purpose.

[3 + 2 = 5]

✓ 5. (a) What is Packet Switched network?

✓ (b) Mention the advantages and disadvantages of Virtual Circuit and Datagram approaches in Packet Switched network.

[2 + 3 = 5]

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(2021CSB043)