

Indian Institute of Engineering Science and Technology, Shibpur
B.Tech. (IT) 6th Semester Mid-Semester Examinations 2022

Subject: Computer Networks (IT 3202)

Full Marks: 30

Time: 45 Minutes

Answer all the questions

- Q1.** Why do optical signals used in fiber optic cables have a very short wave? What is the purpose of using cladding in optical fiber cable? **1+2**
- Q2.** Which signal has a wider bandwidth, a sine wave with a frequency of 10 Hz or a sine wave with a frequency of 200Hz? **1**
- Q3.** Define the following terms: Single bit error and burst error and redundancy. **2**
- Q4.** Station A sending needs to send a message consisting of 9 packets to station B using a sliding window Go-Back-N protocol of window size 3. All the packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no acknowledgement frames from B ever get lost), then what is number of packets A have to transmit for sending the message to B? **7**
- Q5.** On a wireless link, the probability of packet error is 0.2. A stop-and-wait protocol is used to transfer the data across link. The channel condition is assumed to be independent from transmission to transmission. What is the average number of transmission attempts required to transfer 100 packets? **4**
- Q6.** Suppose we want to transmit the message 1011 0010 0100 1011 and protect it from error using the CRC-8 polynomial $x^8 + x^2 + x + 1$.
i) Determine the message that should be transmitted using polynomial long division method.
ii) If the left most bit of the message is inverted due to noise on the transmission link. How does the receiver knows that error occurred? Show with receiver's CRC calculation. **4+3**
- Q7.** Neatly draw the waveforms resulting from NRZ, NRZI, Manchester and AMI signalling for transmitting the bit stream 00110110. **6**