CS31006: Computer Networks (Theory)
Class Test – I

Time: 1 Hour **Marks: Highest**

Question 1

Answer the following questions:

(1) In asynchronous transmission, explain framing error with an example.[2]

(2) Suppose we want to transmit the message **1011 0010 0100 1011** and protect it from errors using the **CRC-8** polynomial $x^8 + x^2 + x^1 + 1$.

(a) Use polynomial long division to determine the message that should be transmitted. [2]

(b) Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver know that an error has occurred? [2+1]

(c) Suppose you are designing a sliding window protocol for a 1-Mbps point-to-point link to the stationary satellite revolving around the Earth at an altitude of 3×10^4 km. Assuming that each frame carries 1 KB of data, what is the minimum number of bits you need for the sequence number in the following cases? (Assume the speed of light is 3×10^8 m/s.) [1.5+1.5]

(i) Receiver's Window Size = 1.

(ii) Receiver's Window Size = Sender's Window Size.

Question 2

Answer the following questions:

(1) Neatly draw the waveforms resulting from NRZ, NRZI, Manchester and AMI signaling for transmitting the bit stream "00110110". [1+1+1+1]

(2) Briefly describe the working of slotted ALOHA. Derive its maximum efficiency. [1+2]

(3) Prove that if a hamming code satisfies $d_{min} = (2t + 1)$, then the code can correct all bit errors up to and included errors of t bits. [2]

(4) Define BER. [1]