Networking: Homework 3

Problem 1: Aloha Throughput Formula

In an Aloha network, G stands for the average number of frames generated in the network during one frame transmission time. The average number of successfully transmitted frames is then $G \cdot e^{-2G}$.

In a certain pure Aloha network, propagation time is negligible compared to the frame transmission time. Assume that the shared channel is 1Mbps. The frames are 1500 bits.

How many frames will get through if the network offers a load of
a. 1000 frames per second.
b. 1500 frames per second.
c. 500 frames per second.

Problem 2:

Wireless stations are located at most 100 m apart. Assume that CSMA is used. What is the vulnerable time? Assume a (staggering) bandwidth of 600 Mbps (the maximum for IEEE 802.11n). What is the minimum number of bits in a frame.

Problem 3:

What is the AAL bitrate for ATM over Sonet in an STS-3 line. (Both ATM cells and Sonet frames have overhead).