# CMSC 417 Final (Fall 1997)

1.) (15 points) Define **and** explain the following terms:

a) IMP

b) 10Base5

c) HIPPI

d) Congestion window

e) Authoritative record (DNS)

2.) (17 Points) A packet has to travel 3 hops to get from the source to the destination. If dropped, it must be resent by the sender. If the probability of the packet being dropped at any hop is p, what is the mean number of hops traveled per *attempt* to send the packet.

3.) (20 points) Error Codes

a) Compute checksum for 1101 0110 using a 4 bit CRC whose generator function is $x^3 + x + 1$.

b) If you received the message 1000 1110 0000 sent using a Hamming code (left bit least significant, odd parity), what is the correct message?

4.) (15 points) The following steps are a simple private key authentication:

a) Alice sends to Bob a private challenge message, $C_a$.

b) Bob responds with a $<C_b, K_{ab}(C_a)>$

c) Alice decrypts $K_{ab}(C_a)$, is satisfied that Bob is for real, and responds to Bob's challenge with $K_{ab}(C_b)$. This, in turn, allows Bob to authenticate Alice.

Show how a man in the middle attack can defeat the protocol. Please list each step.

5.) (18 points) The role of listen and accept

a) An alternative to the listen/accept pair is to just let a server call accept. When a client connects and no process is calling accept, the connect fails. Explain why this solution would not work for well for busy (frequently connected) servers.

b) Another option is to not use listen, but permit pending connects to linger until accept is called. Why is this solution undesirable?

6.) (15 Points) Shared Media Networks

a) In an Ethernet, why does doubling the bit rate (if everything else remains the same) require halving the maximum cable length?

b) In a token ring, a station must wait for the token to come around to it before sending. Why is it not possible for the station to sense the ring and then start transmitting if there is no traffic?