1.) (15 points) Define and explain the following terms:
   a) IMP
   b) One Time Pad
   c) Link-state Routing
   d) Forbidden Region
   e) Hamming distance

2.) (15 Points) Explain why there is an inherent tension between error detection/correction and encryption.

3.) (20 points) In the garbler, a packet is first considered for dropping, then if not dropped is considered for corrupting. If you are trying to establish a connection to a host 2 hops away (i.e., one intermediate node), what is the chance of a TCP connection establishment being successful (without any re-transmission required) if the probability of dropping is 10% and the probability of corrupting is 10%.

4.) (15 points) Explain what the difference is between one-way and mutual authentication and explain why mutual authentication is better.

5.) (20 points) Explain the difference between how IPv4 and IPv6 handle passing packets through sub-networks with MTU (Maximum Transmission Units) smaller than the originating sub-network could handle. Make sure to explain the advantages of each approach.

6.) (15 Points) What is the maximum possible data rate over a 4Khz pass-band channel with 20 dB signal to noise ratio and using quad-ary encoding?