Indian Institute of Technology Bombay

Department of Electrical Engineering

Handout 1 EE 706 Communication Networks

Quiz 1 : **10 points** January 7, 2010

---

1. What is a communication network? [1 point]

2. A communication network has 4 nodes A, B, C and D. A is connected to B and C, B is connected to A and C, C is connected to A, B and D. All connections are bidirectional. Draw the graph of this network. [1 point]

3. A source node S wants to send 100 bits of information to a destination node D.

   (a) S uses a forward error correction (FEC) scheme which adds 200 bits of redundancy to the information bit string. What is the rate of the FEC scheme? [1 point]

   (b) If an FEC scheme of rate $\frac{1}{5}$ is used by S, what is the amount of redundancy added? [1 point]

   (c) If the channel between S and D has data rate equal to 10 bits per second, what is the time duration of transmission in the above two cases? [1 point]

4. The 3-repetition code maps 0 to 000 and 1 to 111. It can correct one bit error. The 5-repetition code which maps 0 to 00000 and 1 to 11111 can correct 2 bit errors.

   (a) How many bit errors can a 4-repetition code correct? [1 point]

   (b) How many bit errors can a n-repetition code correct when n is odd? [2 points]

   (c) How many bit errors can a n-repetition code correct when n is even? [2 points]

   n is a positive integer in the above two cases.