1. Please explain the below terms in details. [20%]
   A. Poisson Distribution
   B. Inter Symbol Interference
   C. Reuse Distance
   D. Doppler Shift

2. Consider a cruise boat with two passengers. Each passenger will make 3 calls per hour with each call of 5-minute duration. There is only one telephone set on the boat. Please calculate the probability of the phone being occupied by one person while the other person wishes to make a call. (Namely, please calculate the blocking probability.) (In your answer, please provide the drawing of Markov Chain as well.) [20%]

3. Please describe the following protocol in Pseudo code. [20%]
   A. Aloha
   B. *p*-persistent CSMA
   C. CSMA/CD
   D. CSMA/CA

4. Please calculate the maximum transmission rate for a transmission system when the delay spread is 5 ns (nano-seconds). [10%]

5. Please explain the following terms in details. [20%]
   A. System architecture of GSM
   B. TDMA/FDMA/CDMA
   C. Backoff mechanism of IEEE 802.11
   D. Hidden terminal problem

6. Define the **first-meter path loss** as the received signal strength (in dB) when the receiver stands one meter away from the transmitter. Now, consider the case when the first-meter path loss is -20dB . Please calculate the free-space path loss for a receiver if the distance between the transmitter and receiver is [10%]
   A. 10 meters,
   B. 100 meters,
   C. 1 KM.