EE5132/EE5023 – Wireless and Sensor Networks
Part 1: Tutorial 2 – Questions

1. (a) A pure ALOHA system transmits at 16 kbit/s. Each station, on average, sends a 512-bit packet every 20 seconds. What is the number of stations in the system if maximum traffic is carried?
   (b) How many stations could the system accommodate using a slotted-ALOHA protocol?
   (c) In each case, when the system carries maximum traffic, what is the average number of attempts required to send a packet successfully?

2. What are relative advantages and disadvantages of persistent and non-persistent CSMA protocols? What makes you select one over the other? Explain.

3. What are the relative advantages and disadvantages of basic CSMA/CA and CSMA/CA with RTS/CTS protocols? What makes you select one over the other?

4. Suppose the propagation delay is α, SIFS is α, DIFS is 3α, and RTS and CTS are 5α, respectively, for CSMA/CA with RTS/CTS.
   (a) What is the earliest time for the receiver to send the CTS message?
   (b) If the data packet is 100α long, what is the shortest time for the receiver to send the ACK signal?
   (c) Explain why SIFS is kept smaller than the DIFS period?
   (d) Can you make SIFS = 0?