

Wireless Networks

Mid Semester Assignment

Course Code: 102002113

Course Title: Wireless Networks

Instructor: Engr. Ghassan Husnain

Program: BS Computer Science

Total Marks: 30 Time Allowed: 48 Hours (2 Days)

Note: Attempt all Questions:

Q.1.a: Find the channel capacity for a channel with a 600-Hz bandwidth and a signal-to-noise ratio of 600 dB? (3 marks)

Q.1.b: A digitized system is required to operate at 4800 bps. If a signal element encodes an 8-bit word, what is the minimum required bandwidth of the channel? (2 marks)

Q.2.a: Two blue armies are each poised on opposite hills preparing to attack a single red army in the valley. The red army can defeat either of the blue armies separately but will fail to defeat both blue armies if they attack simultaneously. The blue armies communicate via an unreliable communications system (a foot soldier). The commander with one of the blue armies would like to attack at noon. His problem is this: If he sends a message to the other blue army, ordering the attack, he cannot be sure it will get through. He could ask for acknowledgment, but that might not get through. Is there a protocol that the two blue armies can use to avoid defeat? (4 marks)

Q.2.b: Briefly explain the steps performed by the Receiver with the help of diagram of the TCP/IP Protocol Suite? (3 marks)

Q.3.a: Determine the isotropic free space loss in dB's at 6 GHz for the shortest path to a synchronous satellite from earth (35,863 km). At 6 GHz, the wavelength is 0.050 m. (3 marks)

Q.3.b: If the received signal level for a particular digital system is -155 dBW and the receiver system effective temperature is 1600 K, what is E_b/N_0 for a link transmitting 2400 bps? (3 marks)

Q.4.a: Explain what GEO, LEO, and MEO satellites are (including what the acronyms stand for). Compare the three types with respect to factors such as size and shape of orbits, signal power, frequency reuse, propagation delay, number of satellites for global coverage, and handoff frequency. (4 marks)

Q.4.b: Find an Uplink and Round Trip Delay of GEO satellite having an altitude of 36,786 km? (3 marks)

Q.4.c: What are the different Satellite Sub Systems? Briefly explain each of them: (5 marks)
