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| **CISY 333/ BBIT 444/COMP 446 WIRELESS COMMUNICATION** |

**Question 1 (20 Marks)**

1. A site survey is commisioned by your university before rolling out a new wireless infrastructure. Explain any **THREE** factors to be assessed during the survey. (3 marks)
2. Define multiplexing. Why is it necessary to employ any form of multiplexing in digital communication? (3 Marks)
3. Describe 802.11a, 802.11b and 802.11n (3 Marks)
4. Differentiate between an adhoc network and a Piconet (2 marks)
5. While using real life and business examples to support your answer, describe **THREE** major reasons that have led to the growth in wireless networks. (6Marks)
6. With the aid of a well labelled diagram, describe the basic components of a digital communications system (3 Marks)

**Question 2** (20 Marks)

1. You are required to set up a working network for a small office in town. The office has four full time staff who have desktops and 11 field staff who come in regularly with their laptops and tablets. Describe the divices you would need to buy to make sure everyone is connected. Use diagrams if necessary. (6 Marks)
2. Briefly describe the following concepts in wireless communication (4 Marks)
3. Doppler shift
4. Multi path
5. Path Loss
6. Shadowing
7. Describe these components of a simplified GSM architecture (5 Marks)
8. Base station subsystem
9. Handoff
10. Home location Register
11. Mobile station
12. Uplink/Downlink Channels
13. State any THREE Major challenges of using wireless technologies. (5 Marks)

**Question 3** (20 Marks)

1. Differentiate between the following terms as used in wireless digital communications (4 Marks)
2. FHSS vs DSSS
3. OFDM vs CDMA
4. Mobile wireless networks have evolved through four major generations. Briefly describe the evolution path listing major technological breakthroughs in each generations. (8 Marks)
5. Mobile IP is a key protocol that facilitates mobility of hosts while maintaining the same logical address. Using a diagram to illustrate, describe how mobile IP routing is managed to ensure continuity of communication while allowing for mobility. (6 Marks)
6. Describe one major security concern in deploying wireless networks. (2 Marks)

**Question 4** (20 Marks)

1. A transmitter produces 0.175 KW of power. (4 Marks)
   * 1. Express the transmit power in dBm
     2. Express the transmit power in dBW
2. Under the free-space path-loss model, what is the transmit power required to obtain a received power of 2.1 dBm for a wireless system with isotropic antennas (unit gain) and a carrier frequency of 6.0 GHz, assuming a distance of 90 metres. (8 Marks)
3. A police officer in a stationary police car aims a radar gun at a truck traveling directly toward the police car. The frequency of the radar gun is 12.6 GHz, and the frequency of the waves reflecting from the truck and returning to the radar gun is shifted from the emitted by frequency by 2250 Hz. If the speed limit on the road is 80 km/h, should the officer pull the truck over to give the driver a ticket? (8 Marks)