Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH. (COMPUTER AND COMMUNICATION ENGINEERING)

MAKEUP EXAMINATIONS, JUN 2019

SUBJECT: WIRELESS COMMUNICATION AND COMPUTING [ICT 3251]

REVISED CREDIT SYSTEM

(10/06/2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data, if any may be suitably assumed.

1A. Assume all stations can hear all other stations. One station is transmitting after sensing the carrier link is idle. Why does collision still occur after the start of transmission? Explain in detail how this problem can be resolved. **5**

1B. Estimate the feasibility of a 10 km link, with one Base Station (BS) and Mobile Station (MS). The BS is connected to an antenna with 10 dBi gain, with a transmitting power of 40 dBm and a receive sensitivity of -75 dBm. The MS is connected to an antenna with 6 dBi gain, with a transmitting power of 15 dBm and a receive sensitivity of -30 dBm. The cables in both systems are short, with a loss of 3dB at each side at the 2.4GHz frequency of operation. If the link is not feasible, compute the required receiving antenna gain for the same scenario. **3**

1C. State the need for diversity in wireless communication environment. Mention the various ways to achieve diversity. **2**

2A. Registration of MS is an important phase in CDMA. Justify the statement and explain the different methods of registration. **5**

2B. Compare FDM and OFDM. With suitable conceptual models justify the statement 'OFDM is more spectrally efficient than FDM'. **3**

2C. Differentiate between the different categories of routing protocols by emphasizing on how each contribute to the goals of an ideal wireless ad hoc communication system. **2**

3A. Discuss the four technical challenges faced during Wireless Communication. Given that the height of transmitting and receiving antenna are 20 m and 1.5 m respectively with transmitting power of 15 W, having a gain of 17 dBi and 3 dBi respectively separated by a distance of 5 km. Frequency of operation is 12 GHz. Compute the free space and reflected surface loss in dB. 5

3B. Describe Dynamic Spectrum Access employed in Cognitive Radio along with its types. 3

3C. What do you mean by a footprint? Why is the hexagonal shape assumed to be theoretically correct for the cell? Justify. 2

4A. With a neat diagram, elucidate the call processing states in CDMA. Also defend the need for various forward and reverse logical channels in CDMA. 5

4B. Why would one choose CDPD over dedicated packet data networks such as ARDIS? With a neat diagram explain the handoff procedure in CDPD. 3

4C. Differentiate between 2

i. Single carrier and Multi carrier systems.

ii. Spatial diversity and Spatial multiplexing.

5A. Differentiate between MIMO system and Smart Antenna. With suitable justification remark on the statement 'MIMO increases speed, range and reliability'. 5

5B. Illustrate the various types of interferences observed in cellular communication. How can they be controlled? A signal-to-interference ratio of 16 dB is required for a satisfactory forward link performance of a cellular system. What is the optimum cluster size that should be used for maximum capacity if the path loss exponent equals 3? 3

5C. What is meant by infrastructure-based networks? With suitable examples show how they differ from ad hoc networks? 2