Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent institution of MAHE, Manipal)

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

END SEMESTER EXAMINATIONS, APRIL 2018

SUBJECT: WIRELESS COMMUNICATION AND COMPUTING [ICT 3251]

REVISED CREDIT SYSTEM

(18/04/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data may be suitably assumed.

1A. Explain the suitability of Free space and two-ray ground reflection model in the analysis of path loss. Estimate the feasibility with suitable justification of a 12 km link at both ends, 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 -95 dBm. The MS is connected to an antenna with 6 dBi gain, with a transmitting power of 25 dBm and a receive sensitivity of -35 dBm. The cables in both systems are short, with a loss of 6 dB at each side at the 990 MHz frequency of operation. 5

1B. Differentiate between logical channel and physical channel. Explain the common control channels of GSM. 3

1C. How is the existing worldwide web architecture modified to support Wireless Application Protocol? 2

2A. Differentiate between the base station assisted and mobile station assisted handovers. A mobile user is moving from Cell Site A to Cell site B at the speed of 10 km/hr .The radius of the cell site is 700 m. Assume that path loss exponent is 4 and a power of 0 dBm was received at a distance of 1m. Consider the time at which handoff occurs is 6 s. 5

i. Calculate the minimum required margin for handoff.

ii. Compute the distance at which handoff is initiated.

iii. Recalculate (i) and (ii) if the duration over which handoff occurs is 8 s.

2B. With the help of neat diagram, explain various blocks of OFDM system. 3

2C. Explain the principle of diversity. Also differentiate between the macro diversity and micro diversity. 2

3A. With the help of neat diagram, explain how MIMO communication system is used for improving 5
i. Link reliability
ii. System Capacity.
Calculate the channel capacities of the SISO, SIMO, MISO and MIMO systems used for improving link reliability with SNR of 12 dB and signal bandwidth of 1 MHz. Consider 4 x 4 MIMO system.

3B. With the help of neat diagram, explain GPRS architecture. Also write about the different coding schemes used in GPRS. 3

3C. Write the importance of spectrum sensing in cognitive radio? List any three spectrum sensing techniques. 2

4A. How does CDMA support multiple users to transmit on the same channel simultaneously? Write the working procedure for the following features of IS-95. 5
(i) Power Control (ii) Soft Handoff

4B. What are the different technical challenges faced in wireless communication? Explain. 3

4C. Assuming the speed of a vehicle is equal to 30 km/hr and is using carrier frequency of 940 MHz for communication. Calculate coherence time and coherence bandwidth if the rms delay spread of the wireless channel is 2 μsec. At a coded symbol rate of 16.2 kbps, What type of fading will be experienced by the wireless channel? 2

5A. Differentiate between proactive and reactive routing protocols. Explain all the stages of the Dynamic Source Routing protocol with respect to the network shown in Fig. Q.5A. 5

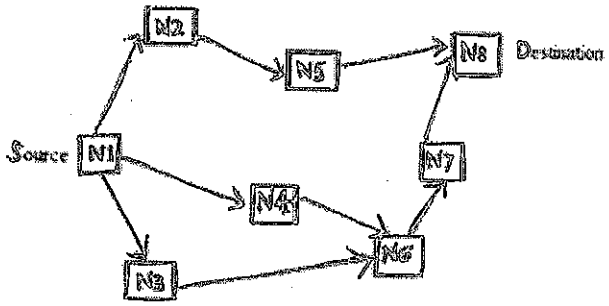

Fig. Q.5A

5B. Differentiate between 3
(i) Downtilt antenna and smart antenna (ii) Frequency selective fading and flat fading
(iii) Fast Fading and Slow Fading

5C. A communication system uses single carrier FDM with five 100 kHz channels. How much saving in bandwidth is possible if OFDM is used instead of FDM, assuming no guard bands between channels? 2