Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VI SEMESTER B.TECH. (Computer and Communication Engineering)

END SEMESTER EXAMINATIONS, APRIL 2017

SUBJECT: Wireless Communications and Computing (ICT – 352)

REVISED CREDIT SYSTEM
(20/04/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ANY FIVE FULL questions.
- Missing data, if any may be suitably assumed.
- Draw diagrams whereever necessary.

1A. A hexagonal cell within a 4-cell system has a radius of 1.387 km. A total of 60 channels are used within the entire system. If the load per user is 0.029 Erlangs, request rate is 1 call/hour and total traffic intensity is 8.8 Erlangs, compute the following for an Erlang C system with a GOS of 5%.
(i) How many users per square kilometer will this system support?
(ii) What is the probability that a delayed call will have to wait for more than 10 seconds?
(iii) What is the probability that a call will be delayed for more than 10 seconds? 5

1B. Explain with a neat diagram how A3, A5 and A8 algorithms guarantee security in GSM architecture. 3

1C. Explain how Bluetooth piconet is formed. 2

2A. Consider a Global Mobile System where the total allocated spectrum is 25 MHz. Each TDMA frame has 8 times slots with the 6 reference bursts and 12 traffic slots. The overhead bits are 168 and 54 for the reference burst and preamble slots with a guard interval of 10.3. Consider the frame duration as 134 ms with a bit rate of 225 kbps. The bit rate of each channel (user) is 22 kbps. Calculate the frame efficiency and the number of channels per frame. 5

2B. With a neat diagram explain the four possible handover scenarios in GSM. 3

2C. Differentiate between GPRS and GSM. 2

3A. With an illustration explain a situation in which a station calls a mobile station, where the calling station could be outside the GSM network or another mobile station. 5

3B. With an example, explain the method of locating co-channel cells in a cellular system. 3

3C. List any two features of TDMA and FDMA. 2

4A. Explain the following with necessary illustrations. 5
   i. Hidden and exposed terminals
   ii. Near and far terminals

4B. Show that radio capacity of a cellular system is as shown below when n=4. 3

$$\frac{B_t}{B_c\sqrt{\frac{2}{3}\left(\frac{C}{I}\right)_{min}}} \text{ radio channels/cell}$$

4C. Explain the different numbers which are used to locate and address the mobile station. 2

5A. With necessary illustrations, explain in brief the basic DFWMAC-DCF with five competing senders. 5

5B. What are the different variations of the CSMA strategy? Explain. 3

5C. Explain the basic schemes used for analog modulation. 2

6A. Explain Integrated Services Digital Network in detail. 5

6B. What are the various types of links in SS7? Explain with necessary illustrations. 3

6C. With a neat diagram, explain the FHSS PHY packet format. 2