ROLL NO. _____

Code: AE76 Subject: WIRELESS AND MOBILE COMMUNICATIONS

AMIETE – ET

Time: 3 Hours **DECEMBER 2012** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: **(2×10)**

a. IMT-2000 is a _____ generation cellular wireless system.

(A) First **(B)** Second
(C) Third **(D)** Fourth

b. Frequency Reuse distance is given by _____

(A) $D = R\sqrt{3N}$ **(B)** $\frac{R}{D} = \sqrt{3N}$

(C) $\frac{R}{D} = \frac{1}{\sqrt{3N}}$ **(D)** $D = \sqrt{3NR}$

c. In _____, a mobile station always communicates with just one base station.

(A) Roaming **(B)** a hard handoff
(C) a soft handoff **(D)** a roaming handoff

d. GSM employs _____ as the multiple access technique.

(A) FDMA **(B)** CDMA
(C) W-CDMA **(D)** TDMA

e. Spread spectrum techniques are employed in _____ system.

(A) CDMA **(B)** FDMA
(C) TDMA **(D)** AM

f. If the total number of channels in a cellular system is 119 and the reuse cluster size = 7, then the number of channels per cell = _____.

(A) 7 **(B)** 17
(C) 119 **(D)** 10

g. IS-95 uses CDMA bands of _____ per band.

(A) 1.25 MHz **(B)** 12.5 MHz
(C) 25 MHz **(D)** 200 KHz

h. GEO is situated at about _____ above the earth's surface.

(A) 500 Kms **(B)** 1500 Kms
(C) 20,000 Kms **(D)** 36,000 Kms

i. IEEE 802.11 group of standards use _____ protocol to resolve shared access of the channel.

(A) CSMA **(B)** CSMA /CD
(C) ALOHA **(D)** CSMA /CA

j. Bluetooth Corresponds to _____ .

(A) WPAN **(B)** WMAN
(C) WLAN **(D)** Above Networks.

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Draw the schematic diagram of a cellular system and explain the function of each section in the system. **(6)**

b. Differentiate between a discrete random variable and a continuous random variable. **(4)**

c. If a total of 33MHz bandwidth is used for a particular cellular system which uses two 30 KHz simplex channels to provide full duplex voice channels, compute the number of simultaneous calls that can be supported per cell if the system uses: **(6)**
(i) TDMA with 8 way time multiplexing
(ii) FDMA

Q.3 a. What are the differences between intersymbol interference and co-channel interference? Explain with suitable diagrams. **(6)**

b. A transmitter produces 50 W of power and is applied to a unity gain antenna. With 900 MHz Carrier frequency find the received power in milliwatts at a free space distance of 100 meters from the antenna. Assume unity gain for the receiver antenna and no loss in the system hardware. **(6)**

c. Bring out the concept of an interleaver. **(4)**

Q.4 a. Define the following: - **(8)**
(i) Cell capacity
(ii) Frequency reuse
(iii) Cell splitting
(iv) Cell sectoring

b. Explain the concept of CSMA /CA with ACK and CSMA / CA with RTS and CTS. **(8)**

Q.5 a. Explain the concept of TDMA with the help of the basic structure of a TDMA system. **(6)**

b. How many bits can be transmitted in one second using 16 QAM to transmit a binary sequence if the baud rate is 2400 Hz? **(4)**

c. Discuss the concept of channel allocation for overlapped cells with suitable diagrams. **(6)**

Q.6 a. What are the parameters influencing handoff? Explain hard and soft handoff with schematic diagrams. **(2+6)**

b. Draw the figure of generic satellite system architecture and explain the function of each section. **(8)**

Q.7 a. With the help of a block schematic explain the operation of AMPS system. **(6)**

b. How is authentication done in GSM? Explain with a diagram. **(6)**

c. List the key features of IMT-2000 system. **(4)**

Q.8 a. Explain features of wireless sensor network? Explain hierarchical routing in sensor networks with an example. **(2+4)**

b. On what factors routing in a MANET is dependent? Explain table-driven routing. **(5)**

c. Compare the characteristic features of source-initiated and on-demand routing. **(5)**

Q.9 a. Discuss Bluetooth system architecture with a schematic diagram. **(5)**

b. What is SDMA? Explain the basic functions of smart antenna with a diagram. **(2+4)**

c. Give the advantages and disadvantages of UWB technology. **(5)**