Code: AE76   Subject: WIRELESS AND MOBILE COMMUNICATIONS

AMIETE – ET

Time: 3 Hours   **JUNE 2014**   **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. The first mobile radio was developed by

   (A) Marconi   **(B)** Hertz
   (C) Antheil   **(D)** Edison

b. GSM cellular mobile communication service uses

   (A) FDMA for multiple uses
   (B) FDMA for multiple channel access and TDMA for multiple uses
   (C) TDMA for multiple channel access
   (D) Different uplink and downlink modulation techniques

c. If the data unit is 111111 and the divisor is 1010, then the dividend at the transmitter is

   (A) 1111111000   **(B)** 1111110000
   (C) 111111   **(D)** 11111000

d. Statistical multiplexing refers to

   (A) Synchronous TDM   **(B)** Asynchronous TDM
   (C) FDM   **(D)** CPM

e. In a regular hexagonal geometry pattern, the number of cells in a cluster formed by i=2 and j=2 are

   (A) 4   **(B)** 7
   (C) 9   **(D)** 12

f. Interference on voice channel usually causes

   (A) Missed calls   **(B)** Dropped calls
   (C) Blocked calls   **(D)** Cross talk

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g. Presence of objects between the transmitter and receiver results in

(A) Scattering   (B) Refraction
(C) Shadow fading   (D) Doppler effect

h. Frequency reuse factor in cellular system (q) is:

(A) $q = \dfrac{D}{R^2}$ (B) $q = \dfrac{D}{R+1}$

(C) $q = \sqrt{3N}$ (D) $q = \dfrac{D^2}{R}$

i. The most appropriate wireless networking standard for creating PANs is:

(A) I-mode   (B) IEEE 802.15
(C) WiFi   (D) Bluetooth

j. The satellites in the GPS form a set of

(A) celestial bodies   (B) triangular points
(C) orbital position points   (D) reference points

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

Q.2 a. What are the challenges for good cellular system infrastructure?   **(8)**

b. Define Continuous Random Variable. Explain the Cumulative Distribution Function (CDF) and Probability Density Function (PDF).   **(8)**

Q.3 a. In a cellular system, diffraction, reflection and direct path take a different amount of time for the signal to reach a MS. How do you differentiate and use these signals at MS?   **(8)**

b. What are the features of Convolutional Codes? Draw the tree diagram for Convolutional encoder for input data sequence 11001.   **(8)**

Q.4 a. What is the key issue for contention based access protocols? How is it solved? Give an example to explain your answer.   **(8)**

b. What are the advantages of cell sectoring?   Explain with suitable diagram. **(4)**

c. If 40 MHZ of total spectrum is allocated for a duplex wireless cellular system and each simplex channel has 25HZ RF bandwidth, find:

(i) the number of duplex channels

(ii) the total number of channels per cell site

If N = 3, cell re-use is used.   **(4)**

Q.5 a. Explain the concept of TDMA with the help of the basic structure of a TDMA system.   **(8)**

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b. What do you mean by channel allocation in cellular system? Explain the specific advantages of Dynamic channel allocation over static channel allocation. **(8)**

Q.6 a. What are the parameters influencing handoff? Explain hard handoff and soft handoff with schematic diagram. **(8)**

b. Explain with neat diagram the satellite system architecture. **(8)**

Q.7 a. With the help of a block schematic explain the operation of AMPS system. **(8)**

b. With the help of diagram, explain the process of authentication be done in GSM. **(4)**

c. Discuss the key features of IMT – 2000 system. **(4)**

Q.8 a. What do you mean by Routing in Mobile-Adhoc Networks? Explain Dynamic Source routing with neat diagram? **(8)**

b. Explain wireless sensor networks. **(8)**

Q.9 a. Compare the usefulness and limitation of WMANs, WLANs and WPANs. **(8)**

b. Give the advantages and disadvantages of UWB technology. **(4)**

c. Explain the 'RICOCHET' wireless microcellular data network. **(4)**