Subject: WIRELESS AND MOBILE COMMUNICATIONS

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

JUNE 2011

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. _____is a second generation cellular phone system.

(A) IS-95 **(B)** AMPS
(C) IMT-2000 **(D)** CDMA-2000

b. Air interface is used between _____ and _____

(A) PSTN, MSC **(B)** MSC, BSC
(C) MS, BS **(D)** BS, BSC

c. Block coding can help in _____ at the receiver.

(A) Synchronization **(B)** Error detection
(C) Attenuation **(D)** Synchronization and error detection

d. Frequency reuse _____ the capacity utilization of the available bandwidth.

(A) Decreases **(B)** Increases
(C) Leads to no change in **(D)** Reduces

e. AMPS uses _____ for modulation,

(A) FM **(B)** FSK
(C) PM **(D)** FM and FSK

f. Wireless LAN uses _____ protocol to resolve shared access of the channel.

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

g. In the _____ method, the sender hops from frequency to frequency in a specific order.

(A) FHSS **(B)** DSSS
(C) OFDM **(D)** HR - DSSS

h. Rake receivers are used in _____ to combine the output of several received signals.

(A) GSM **(B)** Wireless LAN
(C) IS - 95 **(D)** Bluetooth

i. Which orbit has the highest altitude?

(A) GEO **(B)** HEO
(C) MEO **(D)** LEO

j. A one to many communication between a source and a specific group of recipients is classified as a _____ communication.

(A) Unicast **(B)** Broadcast
(C) Multicast **(D)** Unicast and broadcast.

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

Q.2 a. How is adhoc network different from a cellular network? Explain in brief. **(6)**

b. A total of 45MHz of bandwidth is allocated to a particular cellular telephone system which uses two 25 KHz simplex channels to provide full duplex voice and control channels. Compute the number of calls that can be provided per cell the cellular system uses (i) FDMA (ii) TDMA with 8-way time multiplexing. Assume 10% of the bandwidth is reserved for the control channels. **(6)**

c. Define (i) A random variable & its types.
(ii) Probability density function of a continuous random variable. **(4)**

Q.3 a. Discuss the difference between fast fading and slow fading. **(6)**

b. How much is the maximum Doppler spread in a 2.4 GHz mobile system if the user is moving at 200 Kmph in a high speed train? **(4)**

c. Explain convolution code encoder with its state diagram. **(6)**

Q.4 a. With an illustration, Explain the principle of frequency reuse in cellular mobile communication system; also list its advantages. **(6)**

b. A cellular system has a cluster of 4 cells as the basic module for frequency reuse, find the reuse distance, D if the radius of each cell is 5 Km. **(4)**

c. Explain the mechanism of collision avoidance in CSMA / CA protocol. **(6)**

Q.5 a. Discuss the various multiple access system for cellular system with relevant diagrams. **(9)**

b. Explain fixed channel allocation (schemes) with respect to simple and complex borrowing schemes. **(7)**

Q.6 a. Draw the schematic of a typical satellite system and explain its salient features. **(6)**

b. Explain the various components of a cellular system with the help of a detailed block schematic **(8)**

c. Differentiate between handoff and roaming. **(2)**

Q.7 a. What is the role of different functional planes in GSM? Explain each one clearly. **(6)**

b. Explain UMTS network architecture with a block schematic. **(8)**

c. Draw the frame structure in TDMA for GSM system. **(2)**

Q.8 a. What is MANET? Explain with a diagram. What are its characteristics and applications? **(4+2+2)**

b. Draw and explain the general architecture of a fixed sensor node, how are sensor network classified? **(6+2)**

Q.9 a. Discuss the various features of WLAN with more stress on IEEE 802.11 standard. **(8)**

b. Write short note on UWB technology and its applications. **(8)**