DipIETE – ET (NEW SCHEME) – Code: DE66

Subject: WIRELESS & 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. A cellular system contains

        (A) Communication direct communication from mobile to mobile
        (B) Communication through intermediate base station
        (C) Communication through a wired back bone
        (D) Communication through underground optical fiber

    b. The Received power at the receiver is

        (A) Inversely proportional to fourth power of distance
        (B) Inversely proportional to distance
        (C) Inversely proportional to square of the distance
        (D) Inversely proportional to square root of the distance

    c. Due to fast mobility of MS there is

        (A) Doppler effect   **(B)** Frequency reuse
        (C) Contention   **(D)** Co-channel interference

    d. Cell Cluster consists of

        (A) Fixed number of cells   **(B)** Even number of cells
        (C) Random number of cells   **(D)** Always odd number of cells

    e. Frequency reuse may introduce

        (A) Fading of signal   **(B)** Path loss
        (C) Doppler shift   **(D)** Interference

f. In Multiple access

(A) Number of similar sources can be transmitted
(B) The same resource can be used by number of users
(C) Base band can be built
(D) Number of sub carriers can be transmitted

g. GSM Base station uses

(A) fixed channels per user
(B) Static Channel allocation
(C) Dynamic Channel allocation
(D) no channel allocation, the user chooses his channel

h. Mobile satellites are preferred in

(A) Low Earth orbit   (B) Medium Earth orbit
(C) Geo synchronous orbit   (D) Geo stationary orbit

i. IS-41 is a

(A) Communication protocol   (B) Control and signalling protocol
(C) Short message protocol   (D) TCP/IP protocol

j. CSMA is a

(A) Random access protocol   (B) Permanent access protocol
(C) Demand access protocol   (D) Fixed access protocol

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

Q.2 a. With the help of neat diagram explain the concept of cellular communication. Explain the methods adopted to increase user capacity. **(8)**

b. With a neat diagram explain the satellite communication systems. **(8)**

Q.3 a. Distinguish between fast fading and slow fading. Give a few examples. **(8)**

b. A MS is moving with a velocity of 25Km/hr. Calculate the Doppler frequency if the carrier frequency is 980 MHz. Calculate the doppler frequency and the shift if the MS is going away from BS at 45 degrees. Also calculate the coherence BW if the delay spread is 12 microseconds. **(8)**

Q.4 a. Define co-channel interference and adjacent cell interference. **(4)**

b. What is the concept of frequency re-use and how is it implemented, what is its main limitation. **(8)**

c. Calculate the total CIR in frequency reuse due to six cells in the first tier if the radius of coverage of each cell is 2Km. Assume all cells have uniform EoC. The received power is 1 mW. **(4)**

Q.5 a. Explain the need and concept of CSMA/CA in a mobile system. **(4)**

b. What is the need of "Guard Frequency" and "Guard Time"? To which multiple access these are related to. **(4)**

c. Explain the principle of CDMA, how CDMA helps in spectrum reuse. **(8)**

Q.6 a. How does a mobile get connected to a base station, explain the step by step procedure. **(8)**

b. What are the various satellite orbits? Which orbit as per you is suitable for mobile communication and why? **(4)**

c. Calculate the time taken for a signal to reach a satellite from an earth station that looks at the satellite and has an apogee of 300 Km and perigee of 28000 Km. **(4)**

Q.7 a. Draw and explain the GSM infrastructure, how numbering system represents the various codes. **(8)**

b. Explain IMT 2000. **(8)**

Q.8 a. Explain Fixed Wireless sensor networks. **(8)**

b. Explain two routing algorithms used in adhoc networks. **(8)**

Q.9 Write short notes on:

(i) MANET **(4)**
(ii) IEEE 802.11 **(4)**
(iii) Directional & Smart Antennas **(8)**