CS/B.Tech/ECE/Odd/Sem-7th/EC-701/2014-15

# EC-701

## WIRELESS COMMUNICATION AND NETWORK

Time Allotted: 3 Hours                         Full Marks: 70

*The questions are of equal value.*
*The figures in the margin indicate full marks.*
*Candidates are required to give their answers in their own words as far as practicable.*

### GROUP A
### (Multiple Choice Type Questions)

1. Answer any *ten* questions.                         10×1 = 10

(i) Estimate the channel capacity if bandwidth is 2 MHz and if four level signaling is used

(A) 4 Mbps                    (B) 5 Mbps
(C) 7 Mbps                    (D) 4.5 Mbps

(ii) Cell splitting increases the capacity of a mobile system since it increases the number of times that _____ are reused

(A) channels                  (B) times
(C) frequencies               (D) TDMA Slots

(iii) Cordless telephone standard is

(A) PDC                       (B) GSM
(C) WLAN                      (D) DECT

(iv) "Call drop" the term is related to the technique

(A) frequency reuse           (B) handoff
(C) CCI                        (D) ACI

(v) EDGE supports

(A) link allocation           (B) link adaptation
(C) both (A) and (B)          (D) none of these

(vi) A signal has a basic frequency of 1000 Hz. What will be the period?

(A) 0.500 second              (B) 0.001 second
(C) 5 second                  (D) 1000 second

(vii) Modulation scheme used in GSM is

(A) FSK                       (B) GMSK
(C) QPSK                      (D) FM

(viii) CDMA is applied in :

(A) IP layer                  (B) MAC layer
(C) network layer             (D) session layer

(ix) BSIC is defined by the following GSM logical channel

(A) SCH                       (B) PCH
(C) BCCH                      (D) FACCH

(x) GPS is the example of

(A) GEO                       (B) MEO
(C) LEO                       (D) none of these

(xi) The Collision avoidance technique is

(A) CSMA/CA                   (B) CSMA/CD
(C) ALOHA                     (D) none of these

(xii) What is the speed of WLAN Data service?

(A) 12 MHz                    (B) 13 kHz
(C) 12 GHz                    (D) 7 Hz

## GROUP B
### (Short Answer Type Questions)

Answer any *three* questions.                                    3×5 = 15

2.  Why does minimizing the distance between the centers of the nearest        5
    co-channel cells result in increase of capacity size of the cellular
    system?

3.  How does a wireless LAN with 802.11 standard try to solve collisions       5
    or minimize the probability of collisions?

4.  What are the Frequency Hopping Spread Spectrum technique and Direct         5
    Sequence Spread Spectrum technique?

5.  State the five basic standard groups of 3G radio access technologies.       5

6.  What do you mean by cell splitting? Discuss its advantages and              5
    disadvantages.

## GROUP C
### (Long Answer Type Questions)

Answer any *three* questions.                                    3×15 = 45

7.  Consider a cellular system with hexagonal cells of radius $R = 1$ km.       5+5+5
    Suppose the minimum distance between cell centers using the same
    frequency must be $D = 6$ km to maintain the required SIR.

(a) Find the required reuse factor $N$ and the number of cells per cluster.

(b) If the total number of channels for the system is 1200, find the number
    of channels that can be assigned to each cell.

(c) Sketch the adjacent cell clusters and show a channel assignment for the
    two clusters and the required reuse distance.

8.  (a) Discuss the challenges for implementation of WLAN.

(b) Explain the differences between CSMA/CD and CSMA/CA techniques
    in a wireless environment emphasizing on difficulties of
    implementation.

(c) Enumerate the differences between wireless cellular and ad-hoc
    networks.

9.  (a) Describe the different mechanisms of multipath phenomenon.

(b) Describe the two-ray propagation model. On what factors does the loss
    depend for this model?

(c) Describe the basic concept of Frequency selective and non frequency
    selective fading.

(d) What is Doppler spread?

10. (a) How is an IP address acquired by the mobile node in a transparent
    access method?

(b) What are the limitations of Mobile IPv4?

(c) Describe IEEE 802.11 logical architecture.

(d) What are the services that the IEEE 802.11 standard can offer?

11. (a) Draw and explain GPRS network architecture.

(b) What is co channel and inter channel interference? Explain different
    handoff strategies used in mobile system.

(c) Explain two methods to improve the cell capacity.

12. Write short note on any *three* of the following.

(a) 3G over 2G wireless network

(b) Soft and hard hand-off

(c) Forward and reverse link in CDMA IS-95 system

(d) Near and Far problem in CDMA

(e) GSM call set up procedure