Registration no: | | | | | | | | | | |

Total Number of Pages: 2 **M.Tech**
ETPC202

2nd Semester Back Examination 2016-17
WIRELESS COMMUNICATION
BRANCH: COMMUNICATION ENGG, COMMUNICATION SYSTEMS, ELECTRONIC & COMM. ENGG, ELECTRONIC AND TELECOMMUNICATION ENGG, SIGNAL PROCESSING

Time: 3 Hours
Max Marks: 70
Q.CODE: Z1197

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) If 24 MHZ of total spectrum is allocated to a duplex wireless cellular system and each simplex channel has 25 kHz RF bandwidth, find out the number of channels per cell site if N=4 cell reuse is used.

b) What is the need of handoff in mobile communication? Explain the mobile assisted handoff strategy.

c) What is adjacent channel interference and how can it be overcome?

d) A vehicle travels at a speed of 30m/s and uses a carrier frequency of 1 GHz. What is the maximum Doppler shift?

e) What are the advantages of spread spectrum modulation techniques?

f) What is the need of equalization? What type of equalization technique is generally used in mobile fading?

g) Define processing gain in a CDMA system. What is its significance?

h) What are the classes of GPRS equipments?

i) Explain briefly about the microcell zone concept.

j) What are the benefits of cellular and WLAN integration?

Q2 **a)** A cellular system uses a TDMA scheme that can tolerate a signal-to-interference ratio of 16 dB in worst case. Find the optimum value of the cluster size of (i) omnidirectional antenna, (ii) 120^0 sectoring, and (iii) 60^0 sectoring. What will be the advantage of sectoring? Which of these two sectoring will be better? **(5)**

b) What is cell splitting? Explain the 1:4 cell splitting technique. How does cell splitting improve the system capacity? **(5)**

Q3 **a)** Prove that in a hexagonal geometry the number of cells in a cluster, N = $i^2 + j^2 + ij$, where symbols have their usual meaning. And also prove that $D/R = q = \sqrt{3N}$. **(6)**

b) Find the received power for the link from a synchronous satellite to a terrestrial antenna. Use the following data: height = 60000 km; satellite transmit power = 4W; transmit antenna gain = 18 dBi; receive antenna gain = 50 dBi; and transmit frequency = 12 GHz. **(4)**

Q4 **a)** Explain the ground reflection model and find out the expression for the path loss in dB. **(6)**

b) What are co-channel interference and adjacent channel interference? Explain two methods by which adjacent channel interference can be mitigated. **(4)**

Q5 **a)** With block diagram explain the operation of DS-SS transmitter and receiver. **(5)**

b) What are the different types of diversity techniques generally used? Describe the basic principle of each type. **(5)**

Q6 **a)** Explain the IEEE 802.11 WLAN system architecture. **(5)**

b) Represent and explain the 802.11 MAC frame format. **(5)**

Q7 **a)** Explain the GPRS architecture? How is it different from GSM architecture? **(5)**

b) Explain the various types of channels used in GSM system. **(5)**

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) Cell sectoring

b) ALOHA

c) Least mean square algorithm

d) CSMA/CA