Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**
PEEC5302

6th Semester Back Examination 2017-18
MOBILE COMMUNICATION
BRANCH : ECE, ETC
Time : 3 Hours
Max Marks : 70
Q.CODE : C565

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Attempt all parts of a question at a place.

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

a) What kinds of modulation techniques are preferred for mobile communication? Why?
b) Write down the relationship between D, N and R. Where D is the distance between two nearest co-channel cells, N is the cluster Size and R is radius of a cell.
c) A vehicle travels at a speed of 30 m/s and uses a carrier frequency of1 GHz. What is the maximum Doppler shift?
d) Differentiate between *soft handoff* and *hard handoff.*
e) State the properties of MSK modulation.
f) Write the expression for received power in two-ray model and define path loss in dB.
g) Explain Near-far problems in a cellular system.
h) Differentiate between frequency selective fading and fast fading.
i) Write the advantages and the drawbacks of sectoring.
j) What is Umbrella approach to reduce number of handoffs?

Q2 **a)** Show that if the path loss exponent n=4, a cell can be split into four microcells, each with half the radius R and 1/16 of the transmitter power of the original cell. **(5)**
b) What is Co-channel interference? Discuss with the worst case with neat diagram. How can it be minimized? **(5)**

Q3 **a)** Derive an expression for the receiver power in free space. A transmitter produces 100 watts of power and applied to unity gain antenna with 900 MHz carrier frequency. Find the received power if the gain of the receiver antenna is unity. **(5)**
b) Show how 2G GSM systems are moving to achieve 3G services. What are the objectives of 3G system? Write some 3G wireless standards. **(5)**

Q4 **a)** Discuss different multiple access techniques used in mobile Communication. **(5)**
b) 20 MHz of total spectrum is allocated for a duplex wireless cellular system out of which 1MHz is reserved for control channels. Each simplex channel has 25kHz bandwidth. For cluster size of 7, Find **(5)**
(i) Total number of voice channels and control channels per cell.
(ii) Total number of voice channels and control channels per cluster.
(iii) The total geographical coverage area of the cellular system with hexagonal cells of radius R, if the spectrum is reused 100 times.

Q5 **a)** A cellular system is designed to provide a SIR=17 dB in the forward channel. What is the frequency reuse factor and cluster size for achieving maximum capacity, if path loss exponents are (i) 3 and (ii) 3.5 ? **(5)**

b) Write the advantages of CDMA over FDMA and TDMA. **(5)**

Q6 **a)** Derive the relationship for co-channel reuse ratio in terms of the cluster size N and hence determine the signal to interference ratio in cellular system. **(5)**

b) Explain cell splitting operation along with its advantages and disadvantages. When do you need such an operation? How does it improve capacity of a cellular system? **(5)**

Q7 Find the received power at mobile using the two-ray ground reflection model assuming the height of the transmitting antenna is 50 m and the receiving antenna is 1-5m above ground. Derive the formula used in this problem. **(10)**

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

a) WiMAX Standards

b) FH-Spread Spectrum System

c) TDMA

d) Adjacent channel Interference