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B.TECH

(SEM. VIII) THEORY EXAMINATION 2017-18

WIRELESS & MOBILE COMMUNICATION

Time: 3 Hours ***Total Marks: 100***

Note: **1.** Attempt all Sections.
2. Assume any missing data.

SECTION A

1. Attempt *all* questions in brief. **2 x10 = 20**

a. Differentiate hard and soft handoff?
b. What is channel assignment? What are the types?
c. State some applications of spread spectrum modulation.
d. Define diversity?
e. Find the number of duplex channels, if 20MHz of total spectrum is allocated for a duplex wireless cellular system and each simplex channel has 25 KHz RF bandwidth.
f. Write short note on OFDMA?
g. Write range of frequency for forward and reverse link operation for IS-95.
h. What are the services offered by GSM?
i. How IMT-2000 is useful for node to node communication?
j. What is WiMax?

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a. What do you understand by coverage and capacity in cellular systems? Name the techniques used to increase the capacity of a cellular system and compare them.
b. With the help of block diagram and suitable expressions explain the generation and reception of direct sequence spread spectrum (DS-SS) signal using BPSK modulation.
c. Define the term ALOHA. Explain Pure and Slotted ALOHA.
d. Draw and explain the component of mobile network structure of IMT-2000.
e. Explain 4G technologies in detail and also compare it with 1G, 2G and 3G technology.

SECTION C

3. Attempt any one parts of the following: **10 x 1 = 10**

a. Discuss various types of small scale fading based on multipath time delay spread. Distinguish between flat fading and frequency selective fading.

b. What are the limitations of mobile telephone systems? Verify the cluster size $N = i^2+j^2+ij$, where i and j are the integers used to determine the co-channel cells.

4. Attempt any one parts of the following: **10 x 1 = 10**

a) What is PN sequence? Draw suitable PN sequence generator and prove the properties of PN sequence.

b) Derive an expression for selection diversity improvement in terms of probability of receiving signal using single branch or using M branches.

5. Attempt any one parts of the following: **10 x 1 = 10**

a) Explain the structure of RAKE receiver with the help of neat diagram. What is m branch RAKE receiver?

b) Explain SC-FDMA, IDMA schemes and hybrid method of multiple access schemes.

6. Attempt any one parts of the following: **10 x 1 = 10**

a) Explain signal processing and GSM operations from speech input to speech output with diagram. Calculate the total available channels for a cellular system having a total bandwidth of 60 MHz which uses two 50 KHz simplex channel to provide full duplex voice and control channels. Assume that the system uses nine cell reuse pattern and 1 MHz of the total bandwidth is allocated for control channels. Also calculate the number of control channels and voice channels per cell.

b) How does CDMA technology works? Give detailed features of GSM and CDMA mobile standards.

7. Attempt any one parts of the following: **10 x 1 = 10**

a) What do you understand by Mobile Data Network? Explain important features of mobile Ad-Hoc networks.

b) Discuss a complete model of Next Generation Network (NGN) systems for mobile communication. How it is useful for network security?