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B.TECH.

THEORY EXAMINATION (SEM–VIII) 2016-17

WIRELESS & MOBILE COMMUNICATION

Time : 3 Hours *Max. Marks : 100*

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Attempt the following: **10 x 2 = 20**

(a) Find the far field distance for antenna with maximum dimension of 1 m and operating frequency of 900 MHz.

(b) Write the range of frequency for GSM 900 and GSM 1800.

(c) Define Brewster angle. Calculate Brewster angle for a sine wave impinging on the ground having a permittivity of ε=4.

(d) Compare the second generation mobile communication systems in terms of multiple access technology, modulation technique and channel bandwidth.

(e) What is the need of equalization in communication?

(f) How call termination can be avoided during handoff?

(g) Write short notes on FDD and TDD.

(h) Why hexagonal cells are preferred over other shapes in Cellular system?

(i) Write different applications of Mobile ad-hoc network.

(j) Discuss the function of VLR and HLR.

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

(a) Explain the evolution of mobile radio communication.

(b) (i) Discuss survey of equalization techniques.

(ii) Classify and explain diversity techniques used in wireless communications

(c) Discuss the adjacent channel interference. How capacity improvement is achieved using cell splitting approach?

(d) Given a cellular system with a total bandwidth of 30 MHz which uses two 25 kHz simplex channels to provide full duplex voice channels and control channels. Assuming that system uses a nine cell reuse pattern and 1MHz of total bandwidth is allowed for control channel:

(i) Calculate the total available channels.

(ii) Determine the number of control channels.

(iii) Determine the number of voice channels

(iv) Discuss the strategies for distribution of control and voice in each cell.

(e) How does CDMA technology work in principle? Give detailed features of GSM and CDMA mobile standards.

(f) What is handoff? Explain Queuing concept in hand off. What are advantages of delayed handoff?

(g) What are the main characteristics of IMT-2000 standard? Explain the 4G system and its applications.

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

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3 Derive power received in free space propagation model. A unit gain antenna with a maximum dimension of 1m produces 50 W power at 900 MHz. Find (i) the transmit power in dBm and dB, (ii) the received power at a free space distance of 5 m and 100 m.

4 Draw and explain GSM frame structure. Also explain the interfaces used in GSM system.

5 **Explain following:**

(i) Umbrella cell approach (ii) RAKE Receiver