

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 $\epsilon=4$.
 - (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