U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: VII**
Branch: TELECOMMUNICATION ENGINEERING **Duration: 3 hrs.**
Course Code: 19ET7PCWCM **Max Marks: 100**
Course: WIRELESS COMMUNICATION **Date: 12.09.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may suitably assumed.

UNIT - I

1 a) Illustrate with a neat diagram, cellular frequency reuse concept with appropriate equations **08**

b) The acceptable signal-to-interference ratio for a satisfactory forward channel performance of a cellular system is 20dB. Also, from measurements, it is determined that k=4. What will be the minimum cluster size? What is the frequency reuse factor? If N=7, calculate the worst case S/I **06**

c) A cellular service provider decides to use a digital TDMA scheme which can tolerate signal to interference ratio of 15dB in the worst case. Find the optimal value of N for (a) Omni directional antennas (b) 120^0 sectoring (c) 60^0 sectoring. Should sectoring be used? If so, which case: (60^0 or 120^0) should be used? (Assume a path loss exponent of n=4 and consider trunking efficiency). **06**

OR

2 a) Explain the channel assignment strategies for efficient utilization of the radio spectrum **08**

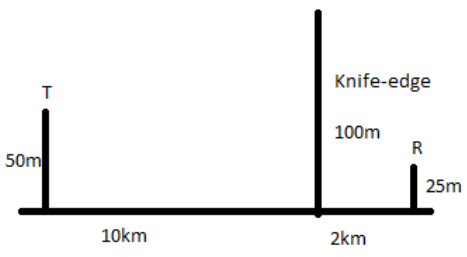
b) Derive the relation between any two nearest co-channel cells having hexagonal geometry **06**

c) Illustrate with a neat diagram, the cell sectoring. **06**

UNIT - II

3 a) For a two ray model, prove that $\Delta = d'' - d' = 2hthr/d$ with a neat diagram **08**

b) Given the following geometry, determine (a) the loss due to knife-edge diffraction. **06**



	c)	Explain three basic propagation mechanisms	**06**

UNIT - III

4	a)	Explain the fading effects due to Doppler spread	**08**
	b)	Illustrate with a neat matrix, a type of fading experienced by a signal as a function of symbol period	**06**
	c)	In the U.S. digital cellular system, if fc= 900MHz and the mobile velocity in 70km/hr, calculate the received carrier frequency if the mobile (a) directly toward the transmitter (b) directly away from the transmitter and (c) in a direction perpendicular to the direction of the arrival of the transmitted signal	**06**

OR

5	a)	With a neat diagram, explain RAKE receiver	**08**
	b)	With a neat diagram, explain space diversity	**06**
	c)	Discuss the operating modes of an adaptive equalizer	**06**

UNIT - IV

6	a)	Analyze the different subsystems and interfaces of GSM Network	**08**
	b)	Illustrate with a neat diagram assignment of time slots in the uplink and downlink	**06**
	c)	Explain the teleservices provided by GSM	**06**

UNIT - V

7	a)	With a neat diagram, explain the evolution of system architecture from GSM and UMTS to LTE	**10**
	b)	Discuss the principle of OFDMA with a neat diagram. How does it differ from traditional Frequency Division Multiplexing (FDM)?	**10**

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