VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD
Accredited by NAAC with A++ Grade
B.E. (E.C.E.) VII-Semester Backlog Examinations, Dec.-23/Jan.-24
Mobile Cellular Communication (PE-I)

Time: **3 hours**   Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO	PSO
1.	What is the shape of the cell site and why is it chosen so?	2	1	1	1,12	2
2.	Find the number of cells in a cluster for the values of the shift parameters i =2 and j =4 in a regular hexagon geometry pattern	2	2	1	1,12	2
3.	Distinguish flat fading and frequency selective fading.	2	3	2	1	2
4.	Define path loss? Give the expression for path loss.	2	1	2	1	2
5.	Differentiate TDMA and FDMA.	2	3	3	1,12	2
6.	Consider codes C0=[1 1 1 1], C1=[1 1 -1 -1] and symbols 1.5, -2.5 for users 0,1 respectively. What is the net transmitted signal?	2	2	3	1,12	2
7.	Consider dB SNR=65 dB in a 1×4 MISO system. Evaluate the BER with transmit beamforming?	2	2	4	2	2
8.	What is deep fade event in multi antenna communication.	2	1	4	1	2
9.	Give the significance of pseudo inverse of channel matrix.	2	1	5	1	2
10.	Consider a bandwidth B=20 MHz and number of subcarriers N=1024 in an OFDM system. Calculate the OFDM symbol time without cyclic prefix.	2	2	5	4	2
	Part-B (5 × 8 = 40 Marks)					
11. a)	Sketch the cellular structure and explain the concept of frequency reuse.	4	3	1	1,12	2
b)	A spectrum of 33MHz is allocated to a wireless FDD cellular system which uses two 25KHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses (a) 4 cell reuse (b) 7 cell reuse (c) 12cell reuse	4	2	1	1,12	2
12. a)	What are the three basic mechanisms of propagation? Explain in detail.	4	1	2	1,12	2

		M	L	CO	PO	
b)	If a transmitter produces 50W of power, which is applied to a unity gain antenna with a 900MHz carrier frequency, find the receiver power in dBm at a free space distance of 100m? What is the received power at a distance of 10Km? Assume unity gain for the receiver antenna.	4	2	2	1,2,4, 12	2
13. a)	What is near far problem is CDMA? What is the necessity of power control in CDMA systems?	4	3	3	1,12	2
b)	Consider noise power is 13dB and spreading length N=512. It is targeted to achieve a BER=5X 10^{-5} at the output in a flat fading CDMA scenario with a single user. What is the required approximate transmit power to such a scenario?	4	2	3	1,12	2
14. a)	Derive the condition for BER for maximal ratio combining of a multi antenna system	4	3	4	2,4	2
b)	Estimate bit error rate of wired communication system.	4	3	4	2,4	2
15. a)	Consider the channel matrix H given as $H = \begin{bmatrix} 1 & -1 \\ 3 & 0 \\ -1 & 2 \end{bmatrix}$ What is the corresponding zero-forcing receiver matrix?	4	2	5	4	2
b)	Explain OFDM transmitter with neat block diagram.	4	2	5	1	2
16. a)	What is Handoff process? What are the factors influencing handoffs?	4	1	1	1,12	2
b)	Distinguish small scale fading and large scale fading with necessary sketch.	4	3	2	1,12	2
17.	Answer any *two* of the following:					
a)	Explain the concept of CDMA with an example.	4	3	3	1,12	2
b)	Consider dB SNR=65 dB in a 1×4 MISO system. Evaluate the BER with transmit beamforming?	4	2	4	2	2
c)	What is the necessity of cyclic prefix in OFDM system?	4	3	5	1,4,12	2

M : Marks;   L: Bloom's Taxonomy Level;   CO; Course Outcome;   PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

*****