K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai) Carry - On

Jul-Aug 2025
(B. Tech) Program: Electronics & Telecommunication Scheme: II
Supplementary: LY Semester: VII
Course Code: EXC702 and Course Name: Mobile Communication Systems
Date of Exam: 11-8-2025 Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	Justify, Cell Sectoring helps in improving capacity of a cellular system with neat diagram and related equations.		CO 1	U
b)	Explain factors influencing the small scale fading in mobile communication.		CO 2	U
c)	Explain identifiers in GSM technology.		CO 3	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Draw and explain Radio Access Network architecture of UMTS.		CO 4	U
b)	Draw and explain 4G LTE technology network architecture.		CO 5	U
c)	Explain MIMO technology with relevant diagram.		CO 6	U
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	Discuss the concept of frequency reuse in cellular communication and solve if a signal to interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system, what is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is (a)n = 4, (b) n = 3? Assume that there are 6 co-channels cells in the first tier, and all of them are at the same distance from the mobile. Use suitable approximations.		CO 1	U, Ap
b)	Write about the concept Free space wave propagation Model with suitable equations. Assume a receiver is located 10 km from a 50 W transmitter. The carrier frequency is 900 MHz, free space propagation is assumed, G1 = 1, and Gr = 2, find (a) the power at the		CO 2	U, Ap

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	receiver, (b) the magnitude of the E-field at the receiver antenna (c) the rms voltage applied to the receiver input assuming that the receiver antenna has a purely real impedance of 50 Ω and is matched to the receiver.			
c)	Describe GSM network architecture and elaborate functions of each block.		CO 3	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	List uplink and downlink channels in CDMA 2000 technology.		CO 4	U
b)	Explain protocol architecture used in 4G LTE.		CO 5	U
c)	Describe cognitive radio systems with diagram.		CO 6	U

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