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

Jan-Feb ~~Nov - Dec 2025~~ 2026
(B. Tech) Program: Electronics & Telecommunication Scheme: II-B
Supplementary ~~Regular~~: LY Semester: VII
Course Code: EXC702 and Course Name: Mobile Communication Systems
Date of Exam: ~~2/12/2025~~ 05/02/26 Duration: 2.5 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)			
a)	Justify, Cell Splitting concept helps in improving capacity of a cellular system with neat diagram and related equations.	10	CO 1	U
b)	List the factors influencing small scale fading.		CO 2	U
c)	Compare technical parameters of GSM and IS 95 CDMA system.		CO 3	U
Q 2	Solve any **two** questions out of three: (05 marks each)			
a)	List technical parameters of UMTS.	10	CO 4	U
b)	Explain network architecture of 4G with suitable diagram.		CO 5	U
c)	Describe Smart Antenna Systems with diagram.		CO 6	U
Q.3	Solve any **two** questions out of three. (10 marks each)			
a)	Discuss the concept of frequency reuse in cellular communication and solve if a signal to interference ratio of 25 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 = 3, (b) n = 2? 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.	20	CO 1	Ap
b)	Write about the concept Friis transmission theory with suitable equations. Assume a receiver is located 15 km from a 70 W transmitter. The carrier frequency is 900 MHz, free space propagation is assumed, G1 = 1, and Gr = 2, find (a) the power at the receiver, (b) the magnitude of the E-field at the receiver antenna (c) the rms voltage		CO 2	Ap

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	applied to the receiver input assuming that the receiver antenna has a purely real impedance of 60 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)	Discuss high level architecture of UMTS with Core network and radio access network with interfaces diagram.			CO 4	U
b)	Describe Physical, Transport and Logical channels in 4G LTE.			CO 5	U
c)	Explain spectrum sensing in Cognitive Radio Networks with diagram.			CO 6	U

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