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

Nov – Dec 2024		
(B. Tech.) Program: Electronics and Telecommunication Engineering	Scheme II	
Carry On Regular Examination: LY Semester: VII		
Course Code: EXC702 and Course Name: Mobile Communication Systems		
Date of Exam: 25/06/25 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, how cell sectoring reduces co-channel interference and increases the capacity.		CO1	U
b)	Explain factors influencing small scale fading in mobile communication.		CO2	U
c)	Describe various handoff procedures used in CDMA IS-95 system with appropriate diagrams.		CO3	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Discuss CDMA 2000 cellular technology Evolution path with technical specifications.		CO4	U
b)	List technical specifications of 4G LTE with accurate values.		CO5	U
c)	Describe spectrum sensing in cognitive radio networks with diagram.		CO6	U
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	Discuss channel allocation strategies in cellular communication and solve, if a total of 33 MHz of bandwidth is allocated to a particular FDD cellular tele phone system which uses two 25 kHz 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) 12-cell reuse. If 1 MHz of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each cell for each of the three systems.		CO1	Ap
b)	Derive total electric field received in the receiver for two ray model and find if a mobile is located 5 km away from a base station and uses a vertical $\lambda/4$ monopole antenna with a gain of 2.55 dB to receive cellular		CO2	Ap

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	radio signals. The E-field at 1 km from the transmitter is measured to be 10^{-3} V/m. The carrier frequency used for this system is 900 MHz (a) Find the length and the gain of the receiving antenna. (b) Find the received Electric field at the mobile using the 2-ray ground reflection model assuming the height of the transmitting antenna is 50 m and the receiving antenna is 1.5 m above ground.			
c)	Explain GSM network architecture with neat diagram and interfaces mentioned.		CO3	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	Explain detailed UMTS network architecture with neat diagrams and interfaces mentioned.		CO4	U
b)	Explain Physical, Transport and Logical channels in 4G LTE with appropriate diagram.		CO5	U
c)	Describe Smart Antenna Systems with relevant diagrams.		CO6	U

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