

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
Regular Examination: LY Semester: VII

Course Code: EXC702

Course Name: Mobile Communication Systems

Date of Exam: 28-11-2024

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)	Explain Umbrella Cell concept.		CO1	U
b)	List factors influencing small scale fading in mobile communication.		CO2	U
c)	List technical specifications of GSM in detail.		CO3	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Describe the forward channels in CDMA 2000 technology.		CO4	U
b)	Draw and Explain Network architecture of LTE.		CO5	U
c)	Write a note on MIMO antenna systems.		CO6	U
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	Explain techniques used to improve the coverage and capacity of cellular network with diagrams and appropriate equations. Find the received power P_r at new and old cell boundaries, in case of cell splitting with radius of old cell as R and new cell radius of R/2, path loss exponent $n=4$.		CO1	U, Ap
b)	Define Ground Reflection mechanism with suitable equations and calculate, 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 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 Find the length and the gain of the receiving antenna. Find the received power at the mobile using 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.		CO2	U, Ap
c)	Explain GSM frame structure in detail with appropriate diagrams.		CO3	U
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	Explain in detail about UMTS architecture with suitable diagram.		CO4	U
b)	Write FDD and TDD Frequency Bands and Spectrum Flexibility in LTE.		CO5	U
c)	Explain architecture of Cognitive radio Systems		CO6	U
