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MANIPAL	INSTITUTE OF TECHNOLOGY
	Manipal University

## SIXTH SEMESTER B.Tech. (E & C) DEGREE END SEMESTER EXAMINATION MAY/JUNE 2016 SUBJECT: MOBILE COMMUNICATION (ECE - 330)

## **TIME: 3 HOURS** MAX. MARKS: 50 Instructions to candidates Answer ANY FIVE full questions. • Missing data may be suitably assumed. 1A. Draw the timing diagram illustrating how a call initiated by a mobile user to the landline subscriber is established. 1B. A cellular system with 12.5 MHz is to be operated in a city of 100 km<sup>2</sup> with an allowed S/I of 12dB. A MS moving with a maximum speed of 72kmph is forced for handoff after 4 min when it crosses the cell for maximum distance. Estimate co-channel antenna spacing, Pth (threshold power), if the handoff processing time is 4sec. Assume $P_0 = 3dBW$ at 1m, n = 3. 1C. In a cellular system S/I is 18dB. Find the appropriate cluster size assuming 'n' as 4 and p=6. (5+3+2)Explain the various Cellular design techniques to provide more channels per unit coverage area. 2A. Write short note on the various multiple access techniques used in mobile communications. Mention 2B. advantages and disadvantages for each technique. 2C. Find the far-field distance for an antenna with maximum dimension of 1 m and operating frequency of 900 MHz. (5+3+2)Derive the equation for power received using free space propagation model. 3A. 3B. A mobile is located 5 km away from a BS 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<sup>-3</sup> V/m. If the carrier frequency used for this system is 900 MHz, Find a) the length and the aperture area of the receiving antenna. b) The received power at the mobile using the 2-ray ground reflection model assuming the height of the Transmitter antenna is 50 m and the receiving antenna is 1.5 m above ground. Write about the various factors influencing small-scale Fading. 3C. (5+3+2)4A. Derive an expression for impulse response model of a multipath channel. 4B. Explain about Rayleigh and Ricean Fading distribution functions. 4C. Classify the types of small-scale fading (5+3+2)Define the following multipath measurement parameters with the help of equations: i) coherence 5A. time ii) coherence bandwidth iii) Mean excess delay iv)RMS delay spread v) Excess delay

	spread
5B.	Explain with neat block diagrams, DPSK transmitter and receiver. Also illustrate with an example,
	the process of differential encoding.
5C.	Draw the block diagram that represents the signal processing in GSM.
	(5+3+2)
6A.	Explain the various types of GSM channels.
6B.	Draw and explain the WAP Protocol stack.
6C.	Mention the steps involved at network layer when a remote host communicate with a mobile host present in a foreign network with help of diagram.
	(5+3+2)