Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SIXTH SEMESTER B.TECH (E & C) DEGREE END SEMESTER EXAMINATION - APRIL / MAY 2017
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 to a mobile user initiated by a landline subscriber is established.

1B. Draw the block diagram of cordless telephone system and explain.

1C. Explain the various types of Handoff strategies.

(5+3+2)

2A. Derive the equation for power received at a distance'd' from the transmitter x using Two-ray ground reflection model. Also represent the equation for path-loss using the same model.

2B. In free space wave propagation, a transmitter transmits a signal with a power of 50 Watts and unity gain and carrier frequency of 900MHz. If there is receiver at a distance of 10km with antenna gain receiver equal to 2, calculate i) the power at the receiver. ii) the magnitude of the E-field at the receiver antenna, iii) the rms voltage applied to the receiver input. Assume that the receiver antenna has an impedance of 50 ohms and is matched to the receiver.

2C. Draw the GSM frame structure. Explain the advantages and disadvantages of TDMA.

(5+3+2)

3A. Derive the equation for power received at a distance 'r' using free space propagation model.

3B. If a transmitter produces 50 watts of power, express the transmit power in units of (a) dBm, and (b) dBW.

If 50 watts is applied to a unity gain antenna with a 900 MHz carrier frequency, find the received power in dBm at a free space distance of 100 m from the antenna. What is P_r (10 km)? Assume unity gain for the receiver antenna.

3C. Find the far-field distance for an antenna with maximum dimension of 1 m and operating frequency of 900 MHz.

(5+3+2)

4A. Derive the impulse response of a multipath wireless channel.

4B. Base station located on top of building radiates a carrier frequency of 1850 MHz and a vehicle is moving with a velocity of 60 mph, compute the received carrier frequency if the mobile station is moving

(a) Directly towards the base station (b) Directly away from the base station (c) In a direction which is perpendicular to the direction of arrival of the transmitted signal.

4C. Define the following: i) Mean Excess Delay ii) RMS Delay spread
iii) Coherence Bandwidth iv) Doppler Spread

(5+3+2)

5A. Draw the architecture of GSM and explain the function of each block.

5B. Classify the fading channels based on time delay spread and Doppler spread and give their characteristics.

5C. A zero mean sinusoidal message is applied to a transmitter that radiate an AM signal with 10 kW power.

Compute the carrier power if the message signal is with 60% modulation. What percentage of the total power is in the carrier? Calculate the power in each sideband.

(5+3+2)

6A. Draw the GPRS network architecture and mention the functions of GGSN and SGSN.

6B. Mention the main features of WAP and also draw its architecture.

6C. What are the types of IEEE 802.11 networks? Mention their features.

(5+3+2)