Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SEVENTH SEMESTER B.TECH (E & C) DEGREE END SEMESTER EXAMINATION
NOV/DEC 2016
SUBJECT: COMMUNICATION SYSTEMS (ECE - 401)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates
- Answer **ANY FIVE** full questions.
- Missing data may be suitably assumed.

1A. With a neat block diagram explain the working of pulse radar system

1B. An L-band radar operating at 1.25GHz uses a peak pulse power of 3Megawatt and must have a range of 185.2 KM for objects whose radar cross section= $1m^2$. If $P_{min} = 2\times10^{-13}$watts, what is the smallest diameter of the antenna with efficiency=65%.

1C. Explain a single delay line canceller used in MTI Radar.

(5+3+2)

2A. With a block diagram briefly explain the various subsystems of communication satellite and discuss the various frequency bands used in communication satellites

2B. A GEO satellite carries a transponder at 4 GHz. The Transmitter is operated at an output power of 10 Watts and drives an antenna with a gain of 30dB. An earth station is at the center of the coverage zone of the satellite, at a range of 38,500 km. Calculate,

a) The flux density at the earth station in dBW/m^2
b) The power received by an antenna with a gain of 39 dB, in dBW.
c) The EIRP of the transponder in dBW

2C. With neat diagrams explain the orbital effects in Satellite communication

(5+3+2)

3A. Explain the principle and working of surface emitting and edge emitting LEDs

3B. With a neat diagram explain conventional cordless telephones

3C. Describe paging system

(5+3+2)

4A. Explain the concept of Fresnel zone. Obtain the expression for the first Fresnel zone clearance.

4B. Consider a Receiver which is located 10 km from a 50 W Transmitter. The carrier frequency is 900 MHz, free space propagation is assumed, $G_t = 1$, and $G_r = 2$, find

(a) The Received power
(b) The magnitude of the E-field at the Receiver antenna
(c) The RMS voltage applied to the Receiver input

Assume, that the Receiver antenna has a purely real impedance of 50 ohm and is matched to the Receiver.

4C. With a neat block diagram explain basic cellular system

(5+3+2)

5A. What is Dispersion? Derive an expression for pulse broadening due to Material Dispersion.

5B. A step index optical fiber has its core and cladding refractive indices as 1.48 and 1.475 respectively. Calculate maximum acceptance angle and NA, assuming that the surrounding medium is a liquid of refractive index 1.33.

5C. Classify the optical fibers based on refractive index profile and compare them

(5+3+2)

6A. Explain different types of signal degradation in optical fibers

6B. With a neat diagram explain PIN photodiode

6C. Explain Power budget in optical fiber communication system

(5+3+2)