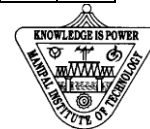




MANIPAL INSTITUTE OF TECHNOLOGY  
Manipal University



Reg. No.									
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**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=  $1\text{m}^2$ . If  $P_{\min} = 2 \times 10^{-13}$  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<sup>2</sup>
  - 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)