First Semester M.Tech. Degree Examination, December 2016
(2008 Scheme)
ELECTRONICS AND COMMUNICATION ENGINEERING
TTC 1006 : Wireless Communication

Time : 3 Hours
Max. Marks : 100

Instructions: 1) Answer any five questions.
2) Each question carries 20 marks.

1. a) State the frequencies used for satellite communication. Why uplink frequencies are higher then down link frequencies? With a block diagram, describe the function of a transmit receive earth station used for telephony. 12

b) In a link budget calculation at 12 GHz, the free space loss is 206 dB, the antenna pointing loss is 1 dB and the atmospheric absorption is 2 dB. The receiver (G/T) is 19.5 dB/K and the receiver feeder losses are 1 dB. The EIRP is 48 dBW. Calculate the carrier to-noise spectral density ratio. 8

2. a) Explain what is meant by geostationary orbit. How do the geostationary orbit and a geosynchronous orbit differ? How is a satellite placed in the orbit? 12

b) Determine the limits of visibility for an earth station situated at mean sea level at latitude 48.42° north and longitude 82.96 degrees west. Assume a minimum angle of elevation of 5°. Given earth radius as 6371 Km and radius of circular orbit 42164 Km. 8

3. a) Explain the WLAN standards. Differentiate to Wi-fi and Wi MAX. 10

b) List and briefly define Bluetooth baseband logic channels. What security services are provided by Bluetooth? 10

4. a) Discuss the various hand off strategies in cellular networks. Differentiate soft hand off and hard hand off. How the coverage area and channel capacity increased for a cellular network? 12

b) Determine the channel capacity for a cellular telephone area comprised of seven macrocells with 10 channels per cell. Also find the channel capacity of each macrocell is split into 5 microcells. 8

P.T.O.
5. a) Discuss the channel capacity of MIMO system.
   b) Discuss the parallel decomposition of the MIMO channel. Find the equivalent parallel channel model for a MIMO channel with channel gain matrix.

\[
H = \begin{bmatrix}
0.1 & 0.3 & 0.7 \\
0.5 & 0.4 & 0.1 \\
0.2 & 0.6 & 0.8
\end{bmatrix}
\]

6. a) Differentiate GPS and DGPS. Discuss the GPS in detail.
   b) Compare the power received in a reflection model and a free space model.