Code No: R05410409 **Set No. 1**

IV B.Tech I Semester Regular Examinations, November 2008
SATELLITE COMMUNICATIONS
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Discuss in detail the Design Consideration of a Satellite Communication Systems. [16]

2. (a) What is a Geosynchronous Orbit? Discuss the advantages and disadvantages of these orbits.
   (b) What are Orbital Perturbations? Explain the effects of earth's oblateness on orbital inclination of Geosynchronous Satellite. [8+8]

3. (a) Write short notes on "Telemetry Tracking and Command System".
   (b) Explain the importance of reliability in the design and construction of Satellites. [8+8]

4. (a) What are the factors that effect the uplink and down link design in geo stationary satellite system. Discuss in detail.
   (b) For an EIRP of 100 dBW, a carrier frequency of 10 GHz and the distance between earth station and satellite of 36000Km. Calculate the CNR in 10MHz bandwidth if the ground station G/T is 20 dB/K. [8+8]

5. A BPSK TDMA system is to transmit 1000 digital voice channels, each with 4 bits per sample at a 64kbps rate. The system must accommodate 1000 data bits/slot at a frame efficiency of 90%.
   (a) What is the number of slots in a frame?
   (b) What is the length of TDMA frame?
   (c) How many preamble bits can be used?
   (d) What is the required satellite bandwidth? [16]

6. (a) What are the functions of Earth station Tracking system to be performed?
   (b) Explain the functional elements of a satellite tracking system? [6+10]

7. (a) Explain the general aspects of coverage and frequency considerations of low earth orbit.
   (b) Why L-band is allocated for mobile satellite service? [8+8]

8. Explain about:
   (a) GPS receiver

(b) GPS codes. [8+8]

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Code No: R05410409 **Set No. 2**

IV B.Tech I Semester Regular Examinations, November 2008
SATELLITE COMMUNICATIONS
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Write a brief history of Indian Satellite Communication. [16]
2. (a) Draw the geometry of a geostationary link showing elevation, azimuth and range.
   (b) A geostationary satellite moving in an equatorial orbit is at a height of 35786Km from the earth's surface. If the earth radius is taken as 6378 Km, determine the theoretical maximum coverage angle and maximum slant range. [8+8]
3. (a) Describe the three types of antennas used in Satellites.
   (b) Write short notes on "Transponders". [8+8]
4. (a) Explain the design procedure of Satellite Communication Link.
   (b) Thermal Noise in an earth station receives results in a $(C/N)d_N$ ratio of 20.0 dB. A signal is received from a bent pipe transponder with a carrier to noise ratio $(C/N)_{Up}$ = 20.0dB. What is the value of overall $(C/N)_0$ ratio at the earth station the earth station. If the transponder introduces intermodulation products with (C/I) ratio =24dB. What is the overall $(C/N)_0$ ratio at the receiving earth station. [8+8]
5. What is a burst? Explain the difference between the reference burst and traffic burst. Explain their positions in a TDMA frame. Explain their structures too.[16]
6. (a) What are the different types of antenna mounts?
   (b) Suppose the receiver antenna is a parabolic dish antenna with diameter of 1.75m and is operation with a horn at 5.956GHz. Calculate the antenna operation and the gain in db. The efficiency of receiving antenna is 80%? [6+10]
7. Explain the set of specifications to illustrate non-geostationary satellite systems. [16]
8. (a) Explain the C\A code generator of GPS.
   (b) Explain the simplified block diagram of a C\A code GPS receiver. [8+8]

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Code No: R05410409 **Set No. 3**

IV B.Tech I Semester Regular Examinations, November 2008
SATELLITE COMMUNICATIONS
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) List the various Benefits and Drawbacks of Satellite Communications.
   (b) Explain the various reasons for preferring Satellites than Optical Fibers which are providing very high bandwidth. [8+8]
2. (a) Explain orbital effects in Communication System Performance.
   (b) Describe the orbit and explain how the satellite is located with respect to earth. [8+8]
3. (a) Why blue light sensitive solar cell are preferred for power generation at satellite.
   (b) Discuss the Satellite Antennas in Practice. [8+8]
4. (a) Why uplink frequency is different from down link frequency in a satellite communication system? Discuss.
   (b) Derive the general link design equation. Find out the expression for (C/N) and (G/T) ratios. Explain the importance of these ratios in satellite link design. [8+8]
5. (a) Illustrate the DS-SSCDMA with seven chip spread code sequence 1110100.
   (b) Show a base band correlator for discrete spread CDMA system? [12+4]
6. In Earth station explain:
   (a) Low-noise amplifier
   (b) High power amplifier and mention advantages and disadvantages and applications. [16]
7. Explain the following in LEO:
   (a) Internal growth
   (b) Interim operations
   (c) Replenishment options
   (d) End-to-End system implementations. [16]
8. (a) What is meant by differential phase GPS?
   (b) What are uses of kinematics DGPS? [12+4]

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Code No: R05410409 **Set No. 4**

IV B.Tech I Semester Regular Examinations, November 2008
SATELLITE COMMUNICATIONS
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Discuss the applications of Satellite Communication. [16]
2. Discuss in detail the effects of Earth Gravitational Force on Satellite. [16]
3. (a) Draw a neat diagram of Telemetry, Tracking and command and explain the operation.
   (b) What is Transponder? How many transponders are provided in a satellite link and discuss about the frequencies used in these transponders. [8+8]
4. (a) What is System Noise Temperature? Derive an expression for system noise temperature of the receiver.
   (b) For a satellite earth station receiver, working on 4GHz, the various gain and equivalent noise temperatures are T_{in}= 50^0 K,T^{RF} = 50^0 K,T_m = 300^0 K and T_{IF} = 1000^0 k, G_{RF} = 23 dB G_m = 0 dB and G_{IF} = 30 dB. Calculate the system noise temperature. [8+8]
5. (a) Define CDMA? What are its advantages?
   (b) Explain the basic principle of a direct sequence spread spectrum [CDMA] system? [6+10]
6. Explain the structure of cassegrain Antenna used for large Earth stations with neat diagram. What are the methods adopted to obtain optimum gain with cassegrain Antennas. [16]
7. (a) Write the advantages and disadvantages of low and medium earth station?
   (b) Explain the general aspects of coverage and frequency considerations of low earth orbit. [8+8]
8. (a) Explain the position location in GPS.
   (b) How clock error is avoided in GPS? [12+4]

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