

Code No: M0425/R07

Set No. 1

IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011
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

1. Explain in detail about India's participation in other International Communication Satellite Systems. [16]
2. Define and Explain the following:
 - (a) Eccentricity
 - (b) Axes
 - (c) Sub Satellite Point
 - (d) Ascending node with respect to a Satellite. [4+4+4+4]
3. (a) Discuss the principle of N-S control of a spinner satellite using infrared sensor with a neat figure.
 (b) Draw the block diagram of typical onboard control system for a spinner satellite and explain its operation. [8+8]
4. (a) Derive the equation for the power received by an earth station from a satellite transmitter.
 (b) A Satellite located in geosynchronous orbit 38,000Km from an earth station, operates at a frequency of 4 GHz and radiates a power of 5W from an antenna with a gain of 10dB in the direction of the earth station. Find the received power, if the receiving antenna has a gain of 52.3 dB. [8+8]
5. What is satellite switching? Explain the difference between static and dynamic switching? Discuss the operation of a typical SS-TDMA system? How is SS-TDMA different from a beam hopping TDMA? [16]
6. (a) Explain the step-tracking system?
 (b) Give a comparison of auto-Track systems? [3+13]
7. Explain important factor that influence the design of [LEO] satellite communication. [16]
8. Write in detail about the differential GPS. [16]

Code No: M0425/R07

Set No. 2

IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011
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

1. (a) Explain why Microwave play an important role in Satellite Communication.
 (b) State the advantages of Satellite Communication over Terrestrial Communication. [8+8]
2. (a) Explain about Expendable launch vehicle(ELVs)
 (b) An Low earth orbit satellite is in circular polar orbit with an altitude of 1000 km. A Transmitter on the satellite has a frequency of 2.65 G Hz. Find:
 - i. The velocity of the satellite in orbit
 - ii. The component of velocity toward an observer at an earth station as the satellite appears over the horizon, for an observer who is in the plane of the satellite orbit.
 - iii. The Doppler Shift of the received signal at an earth station.
 - iv. Find also the Doppler shift for a satellite signal (transmitted by Ka band transmitter at 20.0 GHz). When it is received by the same observer. [8+8]
3. (a) Write short notes on "Satellite Antenna Coverage Zones"
 (b) Discuss Equipment reliability with necessary figures. [8+8]
4. (a) A Satellite at a distance of 40,000Km from a point on earth's surface radiates a power of 5 watts from an antenna with a gain of 16 dB in the direction of the observer. Find the EIRP and power received by an antenna with effective area of 10 m².
 (b) Explain various interference effects, attenuation and noise effects that we may come across in establishing a communication link using satellite. [8+8]
5. (a) Explain the need for a reference burst in a TDMA system. Explain the function of the preamble in a TDMA traffic burst.
 (b) What is the Transmitted power in TDMA network? [12+4]
6. What are the main considerations in the design of the earth station? With the help of block diagram, discuss the operation of atypical large earth Station. How this configuration is is different from that of very small aperture techniques? State reasons for this difference? [16]
7. (a) Explain the equatorial orbits
 (b) Define:

Code No: M0425/R07

Set No. 2

- i. Propagation orbit
 - ii. Retrograde orbit
 - iii. Explain the equation of apparent orbital period. [6+6+4]
8. (a) What is meant by GPS Navigation message?
(b) Write sub frame details of GPS navigation message? [8+8]

FirstRanker

Code No: M0425/R07

Set No. 3

IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011
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

1. Discuss in detail the Design Consideration of a Satellite Communication Systems. [16]
2. Name the Orbital aspects which are of importance in Synchronous Satellite Communication. Explain these aspects. [16]
3. Write in detail about Altitude and orbit control systems (AOCS). [16]
4. (a) Draw the double conversion earth station receiver.
 (b) Design a C band receiving earth station to provide an overall clear air C/N of 13 dB in a 27MHz. IF noise bandwidth at a carrier frequency of 4.06GHz. The antenna noise temperature is 20K and the LNA noise temperature is 55K. Assume a high gain LNA and ignore the noise generated in other part of the receiver. The C-band satellite transponder is operated with 1 dB output back off. clear air atmosphere attenuation on the downlink and other losses total 0.5 dB. Determine the diameter of the receiving antenna, assume aperture efficiency of 65%. The receiving terminal is located on the 3 dB contour of the satellite foot print. [8+8]
5. (a) Explain the back-off in FDMA?
 (b) Explain how Intermodulation frequencies are generated in FDMA? [6+10]
6. Compare the performance of the various types of Tracking system used in Earth stations. Suggest a suitable tracking system for the following Earth station; state the reason for your choice:
 - (a) A large earth station in tropical regions of Earth
 - (b) A medium-sized ship Earth station
 - (c) A medium-sized FSS earth station to be located in a mid-latitude location. [16]
7. (a) Explain Inclined orbits.
 (b) Define master configuration station.
 (c) What are the advantages and disadvantages of Inclined orbits? [8+4+4]
8. Explain about:
 - (a) GPS receiver

Code No: M0425/R07

Set No. 3

(b) GPS codes.

[8+8]

FirstRanker

Code No: M0425/R07

Set No. 4

IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011
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

1. (a) Prove that three Communication Satellites would be sufficient for covering the globe.
 (b) Write a summary of US expandable launch services. [8+8]
2. What is meant by Look Angles? Explain them with reference to a Geostationary Satellite. [16]
3. (a) Explain different types of redundancy connections to complete subsystem reliability of a Satellite System.
 (b) Write short notes on "Spacecraft Subsystems." [8+8]
4. (a) Draw the simplified earth station receiver.
 (b) Derive the noise power in terms of gains and noise temperature of LNA, Mixer and IF amplifier. [8+8]
5. (a) How Intermodulation occurs in FDMA?
 (b) Illustrate the generation of third-order intermodulation in FDMA. [4+12]
6. (a) Explain what is meant by single-entry interference.
 (b) A geostationary satellite employs a 3.5-m parabolic antenna at a frequency of 12GHz. Calculate the -3-db beam width and the spot diameter on the equator. [8+8]
7. (a) What is meant by Sun syn orbit?
 (b) Illustrate with example show the Sun syn orbit is active. [8+8]
8. (a) Explain the GPS satellite.
 (b) What types of services provided by GPS system? [10+6]
