

IV B.Tech I Semester Regular Examinations, November 2005
SATELLITE COMMUNICATION
(Electronics & Communication Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Write a detailed summary about the satellite communication towards year 2000 and 21st century. [16]
2. Compare the propagation effects in the maritime, aeronautical and land mobile satellite channels. [16]
3. (a) What is telemetry? Explain in detail its requirement and analyse it. [8]
 (b) Explain the way by which various parameters in and around the satellite are measured using Telemetry. [8]
4. (a) Explain how power is generated in satellite. [6]
 (b) What is an eclipse? How it affects the satellite function? Explain the way by which the satellite functions normally. [10]
5. (a) Suppose we have a 4-GHZ receiver with the following gains and Noise temperatures. [8]
 - $T_{in} = 50k$
 - $T_{RF} = 50k$
 - $T_m = 500k$
 - $T_{IF} = 1000k$
 - $G_{RF} = 23dB$
 - $G_m = 0dB$
 - $G_{IR} = 30dB$
 Calculate the system Noise temperature.
- (b) If in the above example a section of lossy wave guide is inserted between antenna and RF amplifier. Find the new system noise temperature. [4]
- (c) By what range the insertion of the lossy wave guide increases the over system noise temperature, measured at the CNA input. What will be the Carrier-to-Noise ratio. [4]
6. Explain the Time Division Multiple Access of Satellite System with one example. [16]
7. (a) A 14/11 GHz antenna has a G/T ratio of 40.3dB at 11.2 GHz. The antenna gain is 64dB and the system noise temperature at 10 deg elevation angle in clear air conditions is 234k. The antenna aperture efficiency and noise temperature are detailed in the list below. During heavy rain, the slant path attenuation reaches 8dB for 0.01 percent of the year. Calculate G/T ratio

for their fraction of the year and the corresponding reduction in C/N for the received signal. [10]

Aperture efficiency: 71.3%

Sky noise at 10deg elevation: 30k

LNA noise temperature: 150k

- (b) Explain in detail how geostationary satellites are tracked from the earth station? [6]
- 8. (a) Draw the block diagram of OUTDOOR unit for a DBS home receiver and explain the function of each block. [10]
- (b) Explain how beam steering can be achieved in parabolic reflector antenna. [6]
