

IV B.Tech I Semester Regular Examinations, November 2008
SATELLITE COMMUNICATION
(Electronics & Communication Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. List the various frequency bands being used in satellite communication. Compare the advantages and disadvantages of different bands considering the effects of propagation media. [16]
2. (a) The semi major and semi minor axis of an elliptical satellite orbit are 20,000km and 16000km respectively. Determine the apogee and perigee distances. [6]
(b) A satellite is moving in a near earth circular orbit at a distance of 640 km. Determine its orbital period. [4]
(c) A satellite moving in a molniya orbit having the farthest and the closest points as 35000km and 500km respectively from the earth surface. Determine the orbital time period and the velocity at the apogee and perigee points. [6]
3. How does the satellite maintain its orbit? With a neat block diagram explain orbit control techniques. [16]
4. Explain about the various effects and their remedies of external satellite environment around satellite antenna. [16]
5. (a) What are the various losses to be accounted into the Friis transmission equation for a practical Radio link for calculation of received power and give the altered equation suitably. [8]
(b) A satellite at a distance of 36000km. from a point on the earth's surface radiates a power of 2W from an antenna with a gain of 16dBW in the direction of the observer and operates at a frequency of 11GHz. The receiving antenna has a gain of 523dB. Find the received power. Calculate the path loss also. [8]
6. (a) Consider TDMA frame with the following parameters [8]
TDMA frame length : 16 ms
TDMA burst bit rate : 43 Mbps
32 traffic bursts and 2 reference bursts
CCR sequence : 256 bits
UW sequence : 20 bits
Order wire channel : 512 bits
Management channel : 256 bits
Transmit timing channel : 320 bits
Service channel : 256 bits
Demand assignment channel (superframe short burst only) : 1600 bits

Guard time : 32 bits
Voice channel bit rate : 32 bits

- i. Find the frame efficiency ,
 - ii. Assume that the blocking probabilities at earth stations are mutually independent and equal 0.01. Find the total network traffic intensity.
- (b) A fully connected TDMA network consists of 30 earth stations. There are 400 one-way links with 0.4 erlang, and the rest have 0.2 erlang. Find the number of preassigned channels for the network required to provide a 0.01 grade of service. [8]
7. Draw the block diagram of earth station neatly and explain each block in detail. [16]
8. (a) What is LNA? Why it is required at the front-end of the receiver? Explain. [8]
(b) What is a TVRO? Explain various components of a TVRO system. [8]
