R09

Code No: C6109, C6509

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations March/April-2011
SATELLITE COMMUNICATIONS
(COMMON TO COMMUNICATION SYSTEMS, WIRELESS & MOBILE COMMUNICATIONS)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks

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1. a) Derive the expression for the Velocity of a geostationary Satellite, in its orbit.
   b) A geostationary Satellite moving in an equatorial circular orbit is at a height of 35786Kmt. From the earth's surface. If the earth's radius is 6378Kmt. Find the theoretical Maximum Coverage Angle, and the maximum slant range. [12]

2. Explain in detail about Attitude Control and Orbit Control of a satellite. [12]

3. a) Derive Friss's Transmission Equation.
   b) Show that the noise figure of a lossy Two Port Network is its loss itself.
   c) Derive the expression for the Noise Figure of the cascade of Three Two Port Networks. [12]

4. a) Derive the expression for the Signal to Noise Ratio of an SCPC-FDM-FM-FDMA System.
   b) An SCPC-FDM-FM-FDMA is with a specific Channel S/N = 33 dB. If the Test Tone Peak frequency deviation is 9.1 KHz and the base band signal frequency is 3.4 KHz, find the Band width and C/N ratio. [12]

5. a) Explain about TDMA Frame Structure.
   b) Write about TDMA Burst Time Plan. [8+4]

6. Derive the expression for Throughput of Slotted Aloha Network. [12]

7. Explain about a SPADE Network in detail. [12]

8. A Multiple Carrier satellite Circuit operates in 6/4 GHz Band width with the following characteristics:
   Uplink: Saturation Flux Density : -67.5 dbw/mt^2; I/P Back -off :11dB
   Satellite G/T : - 11.6 dB/^oK.
   Down Link: Satellite Saturation EIRP : 26.6 dBW; O/P Back-off : 6dB.
   Free Space Loss : 196.7 dB; Earth Station G/T : 40.7 dB/^oK.
   Ignoring other losses, calculate the C/N ratio for both links and the combined value. [12]

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