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06EC662

Sixth Semester B.E. Degree Examination, June/July 2013
Satellite Communication

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

1. a. Mention any four advantages of satellite communication. (04 Marks)
b. The earth rotates once per sidereal day of 23 hour, 56 min and 4.09 sec, using Kepler's third law show that radius of geostationary orbit is 42164.17 km. (08 Marks)
c. Define the terms :
i) Line of apsides
ii) Inclination
iii) True anomaly
iv) Line of nodes. (08 Marks)
2. a. State Kepler's laws of planetary motion. (06 Marks)
b. What is meant by geostationary orbit? Mention the conditions that are required for an orbit to be geostationary. (04 Marks)
c. An earth station is located at a latitude of 12°s and longitude 52°W, calculate the antenna look angles for a satellite at 70°W. Given $a_{GSO} = 42164$ km and average earth radius (R) = 6371 km. (10 Marks)
3. a. What is meant by rain rate? And how this is related to specific attenuation? Explain. (04 Marks)
b. Explain feeder losses and antenna misalignment losses. (08 Marks)
c. A receiving system consists of an antenna having a noise temperature of 60 K, feeding directly into LNA. The amplifier has a noise temperature of 120 K and gain of 45 dB. The coaxial feeder between the LNA and the main receiver has a loss of 2 dB, and the main receiver has a noise figure of 9 dB. Calculate the system noise temperature referred to input. (08 Marks)
4. a. Explain how station keeping is done in satellite. (04 Marks)
b. Explain the antenna subsystem. (06 Marks)
c. Explain with neat sketch spin stabilization in the geostationary orbit. (10 Marks)

PART – B

5. a. With neat block diagram, explain indoor units of a home terminal for DBS TV /FM reception. (08 Marks)
b. Explain the classification of possible modes of interference as per international telecommunications union. (08 Marks)
c. Station A transmits at 24 dBW with an antenna gain of 54 dB and station C transmits at 30 dBW. The off axis gain in the S_1 direction is 24.47 dB, and the polarization discrimination is 4 dB. Calculate the [C/I] ratio on the uplink. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 6 a. With neat sketch, explain the workings of spade system. (08 Marks)
b. Explain community antenna TV system. (08 Marks)
c. Determine the probability of false detection for $N = 40$ and $E = 5$. (04 Marks)
- 7 a. Mention the objectives of radar sat program. (04 Marks)
b. Calculate symbol rate that can be transmitted in a 24 MHz bandwidth, for a roll off factor of 0.2. (04 Marks)
c. Explain global positioning satellite system. (06 Marks)
d. Explain frequencies and polarization used in direct broadcast satellites. (06 Marks)
- 8 a. Explain preassigned FDMA for satellite communication with the help of neat figure. (10 Marks)
b. Write an explanatory note on satellite mobile services. (10 Marks)

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