Sr. No...42112

YMCA UNIVERSITY OF SCIENCE & TECHNOLOGY, FARIDABAD

M.TECH., Ist SEMESTER

SATELLITE AND SPACE COMMUNICATION (E16C-603)

Time: 3 Hours **Max. Marks: 75**

Instructions: *1. It is compulsory to answer all the questions (1.5 marks each) of Part -A' in short.*
2. Answer any four questions from Part -B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART –A

Q1 (a) Give the reason for keeping uplink frequency higher than the downlink frequency. (1.5)
(b) Differentiate between symbol error rate and bit error rate. (1.5)
(c) List various frequency bands being used in satellite communication. (1.5)
(d) What are the various interferences that may affect the satellite link performance? (1.5)
(e) What is the difference between multiplexing and multiple access techniques? (1.5)
(f) What is meant by elevation angle? (1.5)
(g) If ratio of orbital heights is 4:3, find out the ratio of orbital periods. (1.5)
(h) What is meant by Azimuth angle? (1.5)
(i) Mention the duration and the month when the eclipse effects are maximum. (1.5)
(j) Differentiate between QPSK and MSK. (1.5)

PART –B

Q2 (a) Explain the basic difference between the active and passive satellite system. Discuss the merits and demerits. (5)
(b) Prove that the motion of satellite is elliptical. (10)

Q3 (a) Explain transponder with the help of block diagram. (10)
(b) Derive Friss transmission equation for satellite links. (5)

Q4 (a) Explain coherent detection of QPSK system. (10)
(b) For a downlink satellite link design EIRP is 50 dB, rain attenuation is 10dB for 6GHz geosatellite, G/T ratio is 12dB. Find out C/T ratio. (5)

Q5 (a) Explain atmospheric absorption, Ionospheric scinnliation, orbital effects. (10)
(b) Explain how earth coverage and slant range of a satellite can be determined and what are maximum values of these parameters for geostationary satellite orbit? (5)

Q6 (a) Explain the parameters that control the design of earth station. What is optimum G/T ratio for standard earth station? (5)
(b) What is the difference between a geostationary satellite and a low altitude satellite? Can a low altitude satellite be also used for communication purpose? If not why? (5)
(c) What is random access. Explain ALOHA. (5)

Q7 (a) What is time division multiplexing? How does it differ from frequency division multiplexing? Explain why TDM is only option for digital satellite link? (5)
(b) Explain the following: (10)
(i) VSAT
(ii) TDMA

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