

Exam.Code:0930
Sub. Code: 6923

1019
B.E. (Electronics and Communication Engineering)
Sixth Semester
EC-605: Satellite Communications

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) Explain what is meant by a polar orbiting satellite.
- b) Explain what is meant by Apogee and Perigee height.
- c) Define and explain the following terms: roll, pitch and yaw.
- d) Calculate the gain of a 3m parabolic reflector antenna at a frequency of 6GHz.
- e) How does an antenna being a passive element, provide gain to a signal? (5x2)

UNIT - I

- II. a) State Kepler's three laws of planetary motion. Illustrate in each case their relevance to artificial satellite orbiting the earth.
- b) Explain the concept of satellite attitude and briefly describe the two forms of attitude control. (5,5)

- III. a) Derive the Link equation showing the relationship between CNR and G/T ratio in the design of satellite downlinks.
- b) Explain the following terms: antenna noise temperature, amplifier noise temperature and system noise temperature referred to the input: A system operates with an antenna noise temperature of 40°K and input amplifier noise of 120K. Calculate the available noise power density of the system referred to amplifier input. (5,5)

- IV. a) Explain what is meant by space attenuation function in connection with the parabolic reflector antennas.
- b) Explain how a solar eclipse affects the working of a communication satellite? Mention the duration and the months when the eclipse effects are maximum. (5,5)

P.T.O.

(2)

UNIT - II

- V. a) Define a GPS system. Briefly discuss its three segments.
b) Explain the comparison between atmospheric attenuation and atmospheric absorption. (5,5)
- VI. a) Explain the concept of cross-polarization discrimination and briefly describe the factors which mitigate against cross-polarization discrimination.
b) Explain in detail the concept of scintillation. (5,5)
- VII. a) Explain in detail what is meant by a plane TEM wave.
b) Draw a labeled diagram for showing a path length through rain and how the rain rate is related to specify attenuation? (5,5)

x-x-x