

1059

M.E. (Electronics and Communication Engineering)
Second Semester
ECE-1208: Satellite Communication

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) Define redundancy and explain why it is necessary for the satellite subsystem.
- b) What is meant by back off of a transponder.
- c) Why uplink and down link frequencies are different in satellite communication?
- d) Define GPS constellation
- e) What are the advantages and disadvantages of satellites in GEO? (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 how solar eclipse affects the working of a communication satellite? Mention the duration and months when the eclipse effects are maximum. (5,5)
- III. a) Explain the attitude and orbit control system present in the space segment
- b) Why G/T is considered the figure of merit for a receiver?
- c) The noise temperature at the input of a satellite receiver is 350K. Input to the receiver is an FM modulated video signal occupying a bandwidth of 18 MHz. Calculate the noise power at the receiver input in dBW. (4,3,3)
- IV. a) What is noise figure and how is it related to noise temperature of an amplifier?
- b) With the help of diagram, explain the functioning of transponders in communication Subsystem. (5,5)

UNIT – II

- V. a) What is scintillation and how and when does it occur?
- b) The elevation angle for a geosatellite at an earth station is 40 deg.-The earth station is situated at an altitude of 500m above the sea level. The stratified height of rain is 2.5 km. Find the path length through rain. Also find the path attenuation for the specific attenuation of 1.8 dB/km.

P.T.O.

(2)

c) Discuss the effects of rain induced cross polarization interference. What are the techniques employed to mitigate the effects of rain attenuation? (3,3,4)

VI. a) How the satellite link position estimated with pseudo range measurement?

b) Discuss the orbital mechanism of GPS system. (5,5)

VII. Write short notes on the following:-

a) TT&C subsystems

b) GPS applications

c) Code and carrier phase measurements (10)

x-x-x