

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017

SATELLITE COMMUNICATION

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Define the terms apogee and perigee.
 - Discuss atmospheric absorption effects on satellite communications.
 - Give the uplink budget of a satellite with neat diagram.
 - What are the advantages of GPS system?
 - What is satellite packet switching?
 - Define carrier to noise density ratio.
 - Explain the FDMA frame structure.
 - Explain the differences between GPS and differential GPS.
 - State the GPS signal levels requirement.
 - Define EIRP.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)**UNIT – I**

- 2 Obtain the orbit equation for an elliptical orbit and prove that the orbital time period T , is given by $T^2 = 4\pi^2 a^3 / \mu$, where a = semi major axis.
- OR**
- 3 (a) Define the terms: (i) Ascending and descending nodes.
(ii) Sun-synchronous orbit.
(iii) Angle of inclination.
(b) Define look angles and derive the expressions for the elevation and azimuth angles.

UNIT – II

- 4 Derive the expressions for the system noise temperature, noise figure and G/T ratio of an earth station receiver.
- OR**
- 5 Calculate the system noise temperature of a 4 GHz receiver having the following gains and noise temperatures. $T_{in} = 25$ K, $T_{RF} = 50$ K, $T_M = 500$ K, $T_{IF} = 1000$ K, $G_{RF} = 23$ dB, $G_M = 0$ dB and $G_{IF} = 30$ dB. Derive the equation for system noise temperature.

UNIT – III

- 6 (a) Distinguish the terms multiplexing and multiple access. Give the calculation procedure of C/N ratio.
(b) What is Inter modulation in FDMA?
- OR**
- 7 (a) Explain TDMA frame structure.
(b) What are the different types of demand assignment multiple access characteristics.

UNIT – IV

- 8 Draw the transmitter and receiver block diagrams of an earth station and explain its working.
- OR**
- 9 (a) Discuss delay and throughput considerations of satellite system.
(b) What are the advantages of LEO satellites comparing geostationary satellites?

UNIT – V

- 10 (a) Explain about the GPS receivers and its codes.
(b) Explain about the differential GPS.

OR

- 11 (a) Explain the position location principles of GPS system.
(b) Explain about GPS navigation message.