Code: 13A04708 **R13**

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)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define the terms apogee and perigee.
(b) Discuss atmospheric absorption effects on satellite communications.
(c) Give the uplink budget of a satellite with neat diagram.
(d) What are the advantages of GPS system?
(e) What is satellite packet switching?
(f) Define carrier to noise density ratio.
(g) Explain the FDMA frame structure.
(h) Explain the differences between GPS and differential GPS.
(i) State the GPS signal levels requirement.
(j) 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, Gm = 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.

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