

R09

Code No: 58025

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech IV Year II Semester Examinations, May - 2016****SATELLITE COMMUNICATIONS****(Electronics and Communication Engineering)****Time: 3 Hours****Max. Marks: 75****Answer any Five Questions
All Questions Carry Equal Marks**

- 1.a) 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.
b) Explain in detail about Orbital perturbations. [8+7]
- 2.a) Derive the expressions for the system noise temperature, noise figure and G/T ratio of an Earth station receiver.
b) Calculate the system noise temperature of a 4 GHz receiver having the following Gains and noise temperatures: $T_{in}=50$ K, $T_{RF}=50$ K, $T_M=500$ K, $T_{IF}=1000^\circ\text{C}$, $G_{RF}=23$ dB, $G_m=0$ dB and $G_{IF}=30$ dB. [8+7]
- 3.a) What are the techniques to implement CDMA?
b) What is Inter modulation in FDMA? Explain with Example. [7+8]
- 4.a) Explain TDMA frame structure.
b) Explain the demand assignment multiple Access characteristics. [7+8]
- 5.a) Draw the receiver block diagram of an earth station and explain its working.
b) A satellite at a distance of 36,000 km from earth radiates a power of 5 W from an Antenna with a gain of 16 dB. Find the power received by an antenna at the earth station with a diameter of 4 m. The loss due to atmosphere is 3 dB and the operating frequency is 11 GHz. [7+8]
- 6.a) What is the need for mobile satellite networks.
b) Discuss different VSAT network configurations. [7+8]
- 7.a) Write short notes on:
i) EIRP ii) Carrier to Noise Density Ratio iii) Energy of bit to noise density ratio iv) G/T ratio
b) Explain Uplink Budget of a Satellite with neat diagram. [8+7]
- 8.a) Explain about the operational NGSO constellation designs.
b) Distinguish between different types of orbits in satellite communication. [7+8]

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