



Reg. No. :

Name :

Eighth Semester B.Tech. Degree Examination, May 2018
(2013 Scheme)
13.806.6 – SATELLITE COMMUNICATIONS (T)
(Elective – VI)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries 2 marks.

(10×2=20 Marks)

1. Explain the following terms in connection with satellite communication, with the help of diagrams.
 - a) Apogee.
 - b) Perigee.
 - c) Ascending node.
 - d) Descending node.
2. What is the effect of atmospheric drag on satellites ? Explain.
3. What is EIRP ? How is it calculated ?
4. What is noise temperature ? How is it related to noise factor ?
5. Explain Demand-Assigned FDMA.
6. Explain DS-SS modulation system.
7. Describe the antennas used in VSAT Earth stations.
8. Draw the block diagram showing a home terminal for DBS TV/FM reception.
9. What is station keeping ?
10. Explain rain depolarization of satellite signals.



PART – B

Answer **any one full** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) State and explain, Kepler's laws of planetary motion, with necessary mathematical formulations. **10**
- b) Explain with necessary mathematical theory, how you can locate a satellite in the orbital plane. **10**

OR

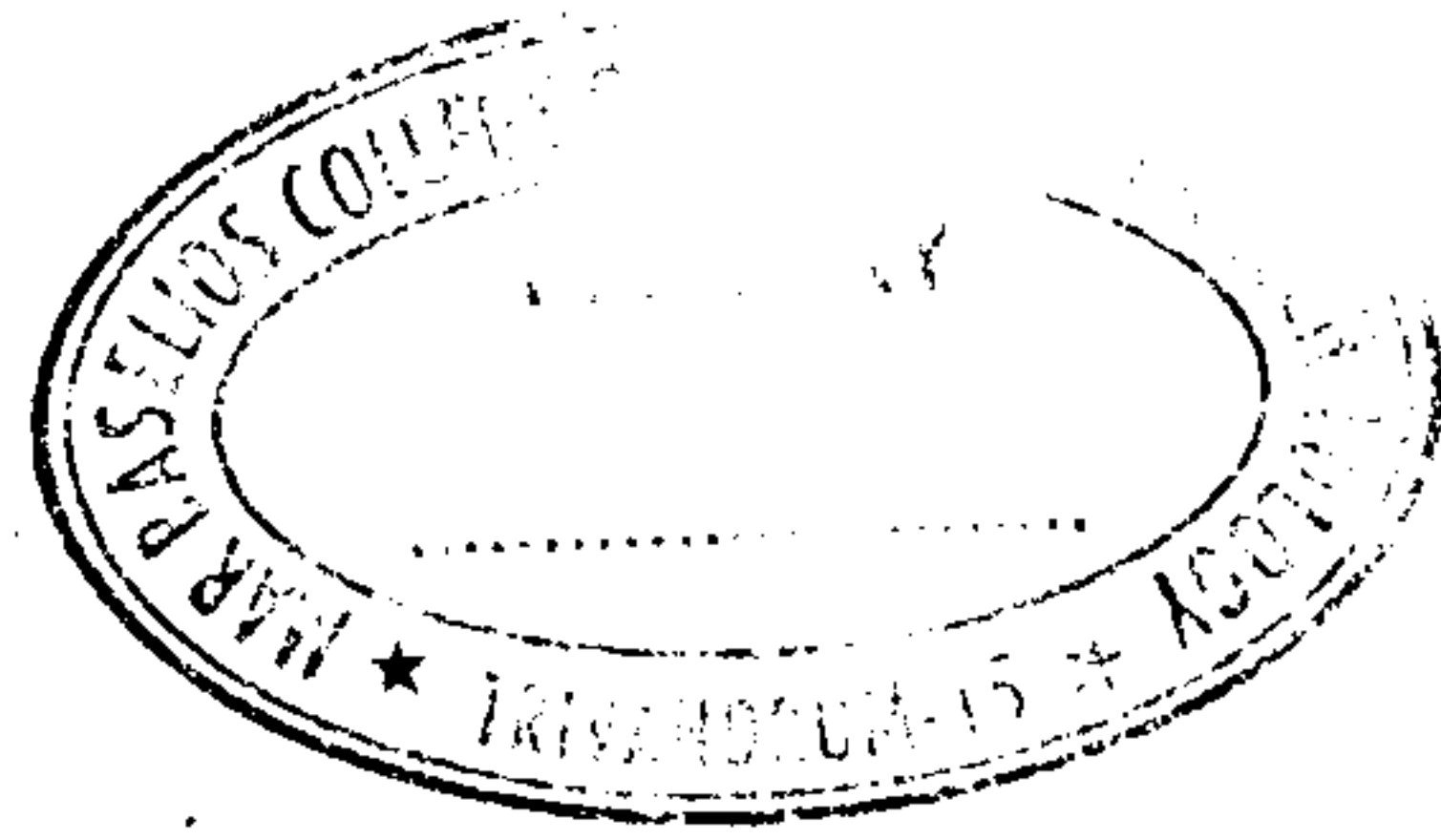
12. a) A satellite is in a 322-km high circular orbit. Determine,
i) The orbital angular velocity in radians per second.
ii) The orbital velocity in meters per second.
Given radius of the earth $R = 6378.137$ km and Kepler's constant $= 3.986004418 \times 10^5$ km³/s². **(2×5=10 Marks)**
- b) Explain the attitude control system of a satellite. **10**

Module – II

13. a) Derive an expression to the CNR of a satellite link. **10**
- b) A CNR of 90 dBHz is required at a receiver having G/T ratio of 12 dB. Total losses in the link amounts to 196 dB. Calculate the EIRP required. **10**

OR

14. a) Consider the transmitting antenna of a geostationary satellite fed with a power P_T of 10W, at a down link frequency $f_D = 12$ GHz and radiating this power in a beam of width $\theta_{3dB} = 2^\circ$. An earth station equipped with a 4 m diameter antenna is located on the axis of the antenna at distance of 40000 km from the satellite. The efficiency of the satellite antenna is assumed to be $\eta = 0.55$ and that of the earth station to be $\eta = 0.6$. Calculate the received power. **10**
- b) Explain the influence of the atmosphere on uplink and downlink transmission of a satellite system. **10**



Module – III

15. Explain in detail, the transmission system of a Digital Video Broadcasting via Satellite (DVBS). **20**

OR

16. a) Explain frequency hop CDMA (FH-CDMA) and its implementation. **10**

b) Explain analog television transmission through satellites. **10**

Module – IV

17. Explain with mathematical theory and necessary diagrams the following transmission losses in a satellite communication system.

i) Free space losses

ii) Feeder losses

iii) Antenna misalignment losses

iv) Fixed atmospheric and ionospheric losses.

(4×5=20 Marks)

OR

18. What are the applications of satellite systems ? Explain in detail. **20**
