

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM
IV B. Tech I Semester Advanced Supplementary Examinations March 2025

SATELLITE COMMUNICATIONS

(Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

UNIT-I

1. a) Explain the key components of a satellite communication system. [7M]
b) What role does atmospheric drag play in low Earth orbits (LEO), and how does it impact satellite lifetimes? [7M]

(OR)

2. a) Discuss the role of satellites play in disaster management and remote sensing? [7M]
b) How do Doppler shift and signal propagation delay impact satellite communication, particularly in low Earth orbit (LEO) satellites? [7M]

UNIT-II

3. a) What challenges are associated with satellite tracking and monitoring over long distances? [7M]
b) How is frequency allocation managed to avoid interference in satellite communications? [7M]

(OR)

4. a) Describe the importance of power budget management in satellite missions? [7M]
b) What processes are involved in ensuring the reliability of satellite subsystems for long-term space missions? [7M]

UNIT-III

5. a) Explain the role of polarization in satellite communication. [7M]
b) Discuss the factors need to be considered when designing a satellite downlink. [7M]

(OR)

6. a) Explain the G/T ratio, and why is it an important figure of merit in satellite link design? [7M]
b) How is the effective isotropic radiated power (EIRP) used in uplink design, and why is it important? [7M]

UNIT-IV

7. a) What are the main challenges of implementing DAMA in real-time satellite communications? [7M]
b) What factors influence the design and size of Earth station antennas, such as frequency and link distance? [7M]

(OR)

8. a) What is spread spectrum transmission, and how is it implemented in satellite communication systems? [7M]
b) What are the key methods used to test the performance and reliability of an Earth station transmitter and receiver? [7M]

UNIT-V

9. a) Explain the typical propagation delays in LEO and GEO satellite communication systems. [7M]
b) What is Differential GPS and how does it improve the accuracy of standard GPS positioning? [7M]

(OR)

10. a) Explain the regulatory challenges faced by NGSO satellite operators. [7M]
b) What are the key steps in the operation of a GPS receiver, from signal acquisition to position determination? [7M]
