Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 10518

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Fifth/Sixth/Seventh/Eighth Semester

Electronics and Communication Engineering

EC 8094 — SATELLITE COMMUNICATION

(Common to: Electronics and Telecommunication Engineering/Geoinformatics Engineering)

(Regulations 2017)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate ascending node and descending node.
2. What do you mean by sun transit outage?
3. Brief on altitude control system.
4. What do you mean by the terms roll, yaw and pitch?
5. Write the uplink and downlink equation of a satellite access.
6. List the ionospheric effects on space link.
7. Why DBS is preferred over conventional schemes? Justify.
8. Specify the need of control bits in the data frame.
9. Compare LEO and MEO satellites.
10. State the functions of INMARSAT.

PART B — (5 × 13 = 65 marks)

11. (a) How Kepler's and Newton's law are adopted for an orbit, explain in detail. Give explanation about satellite launch vehicles.

Or

(b) (i) State the orbital parameters which are essential for positioning a satellite. Explain the positioning parameters in detail. (7)

(ii) With suitable equations explain look angles and the range for geostationary satellite. (6)

12. (a) List the antenna parameters used for the design of a satellite. Explain the parameters and the variety of antennas used for the satellite communication.

Or

(b) With a neat sketch explain the functions of each block of TT & C systems in detail.

13. (a) Discuss in detail the factors that affect the link design of a satellite.

Or

(b) How the uplink design is different from the downlink design? Why the design of downlink is more critical than that of uplink design? In what conditions a complete satellite link becomes downlink limited?

14. (a) Compare CDMA, FDMA and TDMA schemes in detail.

Or

(b) How digital satellite communication differs from analog counterpart, support with relative merits and demerits too? Explain digital transmission system in detail with a neat sketch.

15. (a) Explain the basic principle of VSAT networks, Explain VSAT Minihub network configuration in detail with applications.

Or

(b) What do you mean by GPS? Why is it essential in the modern communication era? Explain the concept in detail taking into account the interacting components and the factor that degrade the accuracy of the system in detail.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Derive general link equation for satellite communication. Find out an expression for C/N and G/T ratios. Explain the importance of these ratios on satellite link equation.

Or

(b) Derive the rocket equation for a satellite and explain detail.
