

CBCS SCHEME



18EC732

Seventh Semester B.E. Degree Examination, June/July 2023 Satellite Communication

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. State and explain Kepler's three laws of planetary motion with neat diagram and necessary equation. (10 Marks)
- b. Explain the terms:
(i) Ascending and descending nodes (ii) Perigee (iii) Apogee
(iv) Equinoxes (v) Semi major axis
Draw the necessary figures. (10 Marks)

OR

- 2 a. Explain the various orbital effects on satellite performance. (10 Marks)
- b. An earth station is located at 30°W longitude and 60°N latitude. Determine the earth station azimuth and elevation angles with respect to a geostationary satellite located at 50°W longitude. The orbital radius is 42164 km. Radius of earth is 6378 km. (10 Marks)

Module-2

- 3 a. Explain Tracking, Telemetry and Command Subsystem using a neat block schematic. (08 Marks)
- b. With a neat schematic, explain generalized Earth Station. (06 Marks)
- c. Discuss the terms: (i) Transponder (ii) Payload in satellite system (06 Marks)

OR

- 4 a. Define EIRP and G/T in design consideration for earth station. (04 Marks)
- b. Explain attitude and orbit control subsystem. (06 Marks)
- c. With a neat block schematic arrangement, explain a regulated bus power supply system. Also discuss types of power systems. (10 Marks)

Module-3

- 5 a. Derive the equation for received power P_R using the basic transmission equation. (10 Marks)
- b. Discuss two commonly used forms of SCPC systems, in detail with relevant figures, and equations. (10 Marks)

OR

- 6 a. A geostationary satellite at a distance of 36000 km from the surface of the earth radiates a power of 10 W in the desired direction through an antenna having a gain of 20 dB. What would be the power density at a receiving site on the surface of earth and also the power received by an antenna having an effective aperture of 10 m²? (10 Marks)
- b. Explain Frequency Division Multiple Access (FDMA), with necessary figures. (10 Marks)

Module-4

- 7 a. Explain communication related applications of GEO and Non-GEO satellites, and their frequency band. (10 Marks)
- b. Discuss Regional Satellite System and National Satellite Systems. (10 Marks)