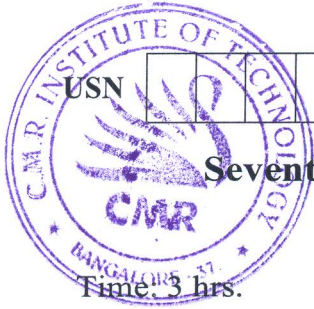


# CBCS SCHEME



18EC732

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

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  $30^\circ\text{W}$  longitude and  $60^\circ\text{N}$  latitude. Determine the earth station azimuth and elevation angles with respect to a geostationary satellite located at  $50^\circ\text{W}$  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  $10\text{ m}^2$ ? (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)

OR

- 8 a. With uplink section of satellite TV networks, explain a typical satellite system. (10 Marks)  
b. Give classification of different types of transponders and discuss any one with the help of figure in communication satellite. (10 Marks)

**Module-5**

- 9 a. Define Remote Sensing. What is its classification? Explain optical remote sensing system based on their spectral regions for data acquisition, in detail. (10 Marks)  
b. Discuss about types of images from weather forecasting satellites. (10 Marks)

OR

- 10 a. Explain principle of operation of GPS system, with relevant figures. (10 Marks)  
b. Write short notes on:  
(i) Thermal Infrared Remote Sensing Systems  
(ii) Applications of Satellite Navigation Systems (10 Marks)

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