

# CBCS SCHEME



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15EC755

## Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Satellite Communication

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Explain the satellite orbits those are classified based on orientation of the orbital plane and distance from the earth. (06 Marks)
- b. Define the following orbital parameters:  
Ascending node, Descending node, apogee, eccentricity, argument of perigee (05 Marks)
- c. State the Kepler's third law and derive the expression of time period for an elliptical orbit. (05 Marks)

OR

- 2 a. Explain the various orbital effects on satellite's performance. (08 Marks)
- b. An earth station is located at  $30^\circ W$  longitude and  $60^\circ N$  latitude. Determine the earth station's azimuth and elevation angles with respect to a geostationary satellite located at  $50^\circ W$  longitude. The orbital radius is 42164 km. (Assume the radius of the earth to be 6378 km) (04 Marks)
- c. Explain the spin stabilization technique for satellite attitude control. (04 Marks)

### Module-2

- 3 a. With neat block diagram, explain the tracking telemetry and command subsystem. (05 Marks)
- b. Explain the generalized earth station architecture. (06 Marks)
- c. Briefly explain the payload subsystem. (05 Marks)

OR

- 4 a. With generalized block schematic, explain the various tasks performed by the earth station's satellite tracking system. (06 Marks)
- b. Explain different types of power systems. (04 Marks)
- c. Explain the different types of earth stations. (06 Marks)

### Module-3

- 5 a. Explain DS-CDMA transmitter and receiver with neat block diagram. (08 Marks)
- b. Explain the basic concept of FDMA. (08 Marks)

OR

- 6 a. What are the advantages of TDMA over FDMA? (04 Marks)
- b. Briefly explain the important parameters that influence the design of a satellite communication link. (08 Marks)
- c. Derive the transmission equation. (04 Marks)

### Module-4

- 7 a. What are the advantages of satellite over terrestrial networks? (04 Marks)
- b. With neat diagram, explain the basic elements of a satellite communication system. (06 Marks)
- c. Explain the satellite cable television. (06 Marks)

OR

- 8 a. Explain the uplink section of a typical satellite TV network. (05 Marks)  
b. What is transponder? Explain transparent or bent pipe transponder. (05 Marks)  
c. Explain the Direct Broadcasting Satellite (DBS) services. (06 Marks)

**Module-5**

- 9 a. Explain thermal infrared remote sensing and microwave remote sensing systems. (08 Marks)  
b. Briefly explain the applications of weather forecasting satellites. (08 Marks)

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OR

- 10 a. With block diagram, explain a typical Geographic Information System (GIS) in remote sensing. (05 Marks)  
b. Explain the operation of the control segment of GPS system. (05 Marks)  
c. Briefly explain the applications of satellite navigation systems. (06 Marks)

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