



**Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024**  
**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 all the three Kepler's laws with necessary figures and expressions. (07 Marks)
- b. The apogee and perigee distances of a satellite orbiting in an elliptical orbit are respectively 45000km and 7000km. Determine the following:
  - i) Semi major axis of the elliptical orbit.
  - ii) Orbit eccentricity.
  - iii) Distance between the center of the Earth and the centre of the elliptical orbit. (06 Marks)
- c. With neat diagram explain the different types of satellite orbits. (07 Marks)

**OR**

- 2 a. With neat diagram, explain the following orbital parameters:
  - i) Apogee
  - ii) Ascending node
  - iii) Eccentricity
  - iv) Argument of perigee. (08 Marks)
- b. Explain spin stabilization and three axis stabilization techniques for satellite altitude control. (06 Marks)
- c. Explain the various orbital effects on satellites performance. (06 Marks)

### Module-2

- 3 a. Explain the solar energy driven power supply system of a satellite. (06 Marks)
- b. Write a note on payload subsystem of satellite. (06 Marks)
- c. With neat block diagram, explain earth station architectures. (08 Marks)

**OR**

- 4 a. Explain Tracking, Telemetry and Command (TT&C) subsystem. (08 Marks)
- b. Briefly explain the following types of earth stations:
  - i) Fixed Satellite Service (FSS) Earth station. (06 Marks)
  - ii) Broadcast Satellite Service (BSS) Earth station. (06 Marks)
- c. With neat block diagram, explain satellite tracking system. (06 Marks)

### Module-3

- 5 a. Explain MCPC/FDM/FM/FDMA system with typical block diagram. (10 Marks)
- b. What are the advantages and disadvantages of TDMA over FDMA? (10 Marks)

**OR**

- 6 a. Explain TDMA typical frame structure. (10 Marks)
- b. Briefly explain important parameters that influence the design of a satellite communication link. (10 Marks)

**Module-4**

- 7 a. With neat diagram explain the two types of satellite transponders. (10 Marks)  
b. Explain the advantages and disadvantages of satellite with respect to terrestrial networks. (10 Marks)

OR

- 8 a. Explain the satellite cable television. (10 Marks)  
b. With neat block diagram, explain the basic elements of satellite communication system. (10 Marks)

**Module-5**

- 9 a. Explain the Optical Remote Sensing system and Thermal Infrared Remote Sensing system. (10 Marks)  
b. Explain the operation of the control segment of GPS system. (10 Marks)

OR

- 10 a. With neat block diagram, explain a typical GIS system in remote sensing. (10 Marks)  
b. List and explain all the applications of weather forecasting satellite. (10 Marks)

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