



# CBCS SCHEME

15EC755

## Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020 Satellite Communication

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Explain Kepler's Laws of planetary motion. Also derive expression for orbital period. (08 Marks)
- b. With neat sketches, define :
- Apogee and perigee
  - Prograde and retrograde orbit
  - Inclination
  - Argument of perigee. (08 Marks)

OR

- 2 a. Explain briefly the following :
- Orbital perturbation (08 Marks)
  - Sun transit outage and Earth eclipse of satellite. (04 Marks)
- b. i) Define Azimuth and Elevation. (04 Marks)
- ii) An Earth station located at  $30^\circ\text{W}$  longitude and  $60^\circ\text{N}$  latitude. Determine look angle parameters with respect to GEO satellite located at  $50^\circ\text{W}$  longitude. The orbital radius is 42164km. (Assume radius of earth to be 6378km). (04 Marks)

### Module-2

- 3 a. i) Mention functions carried by different subsystems of a typical satellite. (08 Marks)
- ii) With neat sketches, explain the working of solar cell. (08 Marks)
- b. Explain Telemetry, tracking and command subsystem. (08 Marks)

OR

- 4 a. Explain Earth station architecture with neat block diagram. (08 Marks)
- b. Explain satellite tracking techniques. (08 Marks)

### Module-3

- 5 a. Explain :
- Demand assigned FDMA (08 Marks)
  - Pre-assigned FDMA. (08 Marks)
- b. Explain general TDMA frame structure. (08 Marks)

OR

- 6 a. With usual notation, derive satellite transmission equation. (06 Marks)  
b. Discuss the parameters influence the design of satellite communication link. (10 Marks)

**Module-4**

- 7 a. i) Explain communication related application of satellites. (08 Marks)  
ii) List the frequency bands used in satellite communication. (08 Marks)  
b. With neat sketches, explain VSAT.

OR

- 8 a. Define transponder. Explain the types of transponders used in satellite. (08 Marks)  
b. Discuss the advantages and disadvantages of satellite over terrestrial network. (08 Marks)

**Module-5**

- 9 a. With neat sketches, explain the principle of working of :  
i) Optical remote sensing (08 Marks)  
ii) Thermal infrared remote sensing. (08 Marks)  
b. Classify the sensors used in remote sensing satellites.

OR

- 10 a. i) Discuss the types of images taken by weather forecasting satellites. (08 Marks)  
ii) Mention the applications of weather forecasting satellites. (08 Marks)  
b. Explain the working principle of GPS.

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