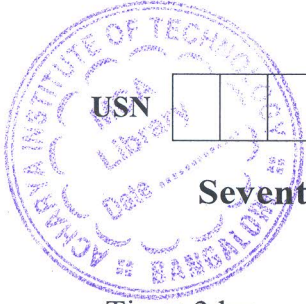


CBCS SCHEME



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17EC755

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. Explain Kepler's law of motion of an artificial satellite around earth. (10 Marks)
- b. Explain briefly five orbital parameters required to determine a satellite orbit. (10 Marks)

OR

- 2 a. Explain briefly the following:
 - (i) Sun transit outage (08 Marks)
 - (ii) Earth eclipse of satellite (06 Marks)
- b. Define Azimuth and Elevation. (06 Marks)
- c. Determine the angle of tilt required for a polar mount used with an earth station at latitude 49° North. Assume a spherical earth of mean radius 6371 km and ignore earth station altitude. (06 Marks)

Module-2

- 3 a. Explain solar energy driven power supply system of a satellite. (10 Marks)
- b. Explain telemetry, tracking and command subsystem. (10 Marks)

OR

- 4 a. Describe with neat block diagram the satellite tracking system. (10 Marks)
- b. List and explain the types of earth stations on the basis of service provided by them and their usage. (10 Marks)

Module-3

- 5 a. Describe the important parameters that influence the design of a satellite communication link. (06 Marks)
- b. Explain general TDMA frame structure. (08 Marks)
- c. In a DS-SS system the information bit rate and chip rate 20 kbps and 20 Mbps respectively. Determine the processing gain in dB. (06 Marks)

OR

- 6 a. With usual notation, derive satellite transmission equation. (06 Marks)
- b. Compare SDMA/FDMA system, SDMA/TDMA system and SDMA/CDMA system. (06 Marks)
- c. A geostationary satellite at a distance of 36000 km from the surface of the earth radiates a power of 10 Watts 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 power received by an antenna having an effective aperture of 10 m^2 . (08 Marks)

Module-4

- 7 a. What is transponder? Explain the types of transponders used in satellite. (10 Marks)
- b. With neat sketches, explain VSAT. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. $42+8=50$, will be treated as malpractice.

OR

- 8 a. Explain communication related application of satellites. (06 Marks)
- b. List the frequency bands used in satellite communication. (06 Marks)
- c. Discuss the advantages and disadvantages of satellite over terrestrial network. (08 Marks)

Module-5

- 9 a. What is Remote Sensing Satellite System? What are its applications? (10 Marks)
- b. Explain the working principle of GPS. (10 Marks)

OR

- 10 a. Explain the weather forecasting satellite payload. (08 Marks)
- b. Classify the sensors used in remote sensing satellites. (06 Marks)
- c. Explain the principle of working of thermal infrared remote sensing. (06 Marks)

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