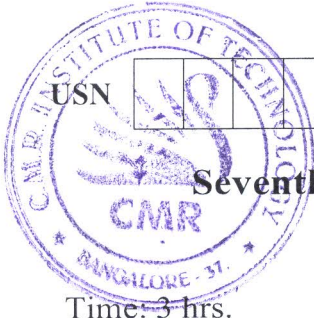


CBCS SCHEME



18EC732

Seventh Semester B.E. Degree Examination, June/July 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. Outline the Kepler's law of planetary motion. Derive the expression for orbital period. (08 Marks)
- b. With the help of neat diagram, explain :
 - i) Apogee and Perigee
 - ii) Prograde and Retrograde
 - iii) Inclination angle
 - iv) Argument of perigee. (08 Marks)
- c. Verify that a geostationary satellite needs to be at a height of about 35780km above the surface of the earth. Assume radius of earth to be 6380km and $\mu = 39.8 \times 10^{13} \text{N/mm}^2/\text{kg}$. (04 Marks)

OR

- 2 a. Explain injection velocity and resulting satellite trajectories with relevant expressions. (10 Marks)
- b. Briefly explain any 4 orbital parameters required to determine a satellite orbit. (06 Marks)
- c. List the conditions of a satellite in order to remain above the same point on the earth's surface. (04 Marks)

Module-2

- 3 a. Describe the Tracking, Telemetry and command subsystem of a communication satellite. (08 Marks)
- b. What are the different components of a satellite's power supply subsystem. Briefly describe the role of each component. (08 Marks)
- c. Define payload. What are the typical payloads of onboard an earth observation and scientific research. (04 Marks)

OR

- 4 a. List and explain the types of earth station based on their usage. (07 Marks)
- b. Describe the satellite tracking system with the help of neat diagram and explain any two tracking techniques. (08 Marks)
- c. Define earth station testing. How are the unit and subsystem testing of earth-station done? (05 Marks)

Module-3

- 5 a. Illustrate the operational principle of FDMA system and what is the significance of guard band in FDMA system. (06 Marks)
- b. Write the TDMA frame structure and explain each one of the block. (08 Marks)
- c. Compare DS/CDMA, FH/CDMA and TH/CDMA system. (06 Marks)

OR

- 6 a. Obtain the transmission equation of satellite link. (06 Marks)
b. Discuss the parameters influence the design of satellite communication link. (10 Marks)
c. Discuss how the frequency re-use is applied in SDMA. (04 Marks)

Module-4

- 7 a. Define transponder. Explain the types of transponder used in satellite. (10 Marks)
b. Discuss the advantages and disadvantages of satellites over terrestrial network. (10 Marks)

OR

- 8 a. With a neat diagram, explain VSAT's networks and VSAT topologies (10 Marks)
b. Briefly discuss the satellite cable television and direct broadcasting with the help of neat diagram. (10 Marks)

Module-5

- 9 a. Classify the satellite. Remote sensing system on the basis of radiation and spectral region used for data acquisition and explain any two methods. (10 Marks)
b. Explain the working principle of GPS system. (10 Marks)

OR

- 10 a. Mention the applications of weather forecasting satellites. (06 Marks)
b. Discuss the types of images and classify the images. (08 Marks)
c. What are the military and civilian applications of satellite navigation system? (06 Marks)

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