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15EC755

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019 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. Define and explain three laws of Kepler to describe the motion of an artificial satellite around earth. (07 Marks)
- b. Explain briefly any six orbital parameters required to determine a satellite orbit. (06 Marks)
- c. A satellite is moving in an elliptical orbit with the major axis equal to 42,000km. If the perigee distance is 8000km. Find the apogee and the orbit eccentricity. (03 Marks)

OR

- 2 a. Explain orbital effects on satellite performance. (05 Marks)
- b. Describe the different types of satellite orbits. (05 Marks)
- c. An earth station is located at 30°W longitude and 60°N latitude. Determine the Earth station's Azimuth and elevation angles with respect to a geostationary satellite located at 50°W longitude. The orbital radius is 42164km. Assume radius of Earth to be 6378km. (06 Marks)

Module-2

- 3 a. Explain solar energy driven power supply system of a satellite. (08 Marks)
- b. Describe the Telemetry, Tele-command and Tracking control monitoring system of a communication satellite. (08 Marks)

OR

- 4 a. Describe with neat block diagram the satellite tracking system and explain any four tracking techniques. (08 Marks)
- b. List and explain the types of Earth stations on the basis of service provided by them and their usage. (08 Marks)

Module-3

- 5 a. Describe the important parameters that influence the design of a satellite communication link. (07 Marks)
- b. Explain the basic concept of TDMA and FDMA. (06 Marks)
- c. In a DS-SS-SSB system the information bit rate and chip rate are 20kbps and 20Mbps respectively. Determine the processing gain in dB. (03 Marks)

OR

- 6 a. Compare FDMA/SSB system, TDMA/SSB system and FDMA/SSB system. (06 Marks)
- b. A Geostationary satellite at a distance of 36000km from the surface of the Earth radiates a power of 10 watts in the desired direction through an antenna having a gain of 20dB. 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 10m². (05 Marks)
- c. Explain Faraday Effect and Scintillation with respect to propagation considerations in satellite link design. (05 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.



Module-4

- 7 a. What is transponder? Why it is referred to as the brain of a communication system? Also explain the various types of transponders. (08 Marks)
b. Explain with neat diagram satellite point to point telephone networks. (08 Marks)

OR

- 8 a. Explain the advantages and disadvantages of satellite over terrestrial networks. (09 Marks)
b. Describe the various methods of reception of satellite T.V programs. (07 Marks)

Module-5

- 9 a. What is Remote sensing satellite system? What are its applications? (08 Marks)
b. Classify satellite Remote sensing system on the basis of radiation and spectral region used for data acquisition, explain any one method. (08 Marks)

OR

- 10 a. Explain the working principles of Global Positioning Satellite (GPS) System. (06 Marks)
b. What are the Military and Civilian applications of satellite Navigation System? (05 Marks)
c. Explain the weather forecasting satellite payload. (05 Marks)

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