



**Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020**  
**Satellite Communication**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
atleast TWO questions from each part.**

**PART – A**

- 1 a. Explain the regions and frequency planning along with frequency band designations for satellite communication. (06 Marks)
- b. Explain briefly about various satellite communication services. (06 Marks)
- c. Explain about the series of INTELSAT. (08 Marks)
- 2 a. State and explain Kepler's three laws of planetary motion with suitable equations and diagrams. (10 Marks)
- b. Calculate the apogee and perigee heights for the orbital parameters given as –  
 $\rho = 0.0014053$ , Mean Motion  $NN = 14.22296917 \text{ rev/day}$ ,  $\mu = 3.986005 \times 10^{14} \text{ m}^3/\text{sec}^3$ ,  
 assume mean radius of earth  $R_p = 6371 \text{ km}$ . (05 Marks)
- c. What is meant by sidereal time? Explain. (05 Marks)
- 3 a. Explain the atmospheric and ionospheric losses that occur in satellite communication. (06 Marks)
- b. Deduce the equation for combined uplink and downlink C/N ratio. (04 Marks)
- c. Calculate for frequency of 12 GHz and for horizontal and vertical and circular polarizations, the rain attenuation which is exceeded for 0.01 percent of the time in any year, for a point rain rate of 10mm/h. The earth station attitude is 600m, and the antenna elevation angles is 50°. The rain height is 3km. (10 Marks)
- 4 a. What is the purpose of altitude control for the satellites? Explain the methods of altitude control. (10 Marks)
- b. Explain in detail a typical transponder channel arrangement in C-band used in satellite communication. (06 Marks)
- c. Explain the routine functions performed by TT and C subsystem aboard the spacecraft. (04 Marks)

**PART – B**

- 5 a. With a neat block diagram explain outdoor and the indoor unit for direct broadcast satellite system for TV. (10 Marks)
- b. With the help of block diagram explain the working of MATV system. Compare CATV and MATV system. (10 Marks)
- 6 a. Explain all the possible modes of interference between satellite circuits and terrestrial station. (10 Marks)
- b. Explain the channeling arrangement and operation multiple access for spade (SCPC) system. (10 Marks)
- 7 a. Explain the following : i) Transponder capacity ii) Bit rates for digital TV ii) Frequency and polarization. (10 Marks)
- b. Explain the different types of mobile satellite services. (10 Marks)
- 8 Write short notes on :
  - a. Radar sat applications
  - b. Global Positioning Satellite System (GPS)
  - c. VAST
  - d. Antenna look angles. (20 Marks)

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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.

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