USN ☐☐☐☐☐☐☐☐☐☐   **10EC662**

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Satellite Communication

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. Describe the characteristics of the domestic satellites which provides a DTH television services. **(08 Marks)**
   b. With neat sketch, explain the principle of operation and its features of polar orbiting satellites and its applications. **(07 Marks)**
   c. Explain the services offered by INTELSATs. **(05 Marks)**

2 a. State Kepplers 3 laws of planetary motion. Illustrate in each case their relevance to artificial satellites orbiting the earth. **(08 Marks)**
   b. What are the conditions to be satisfied for an orbit to be geo stationary and the information needed to determine the look angles for a geo stationary orbit. **(07 Marks)**
   c. A geo stationary satellite is located at 85°W, calculate the azimuth angle for an ES antenna at lat 30°N and long 98°W. Calculate elevation angle, sketch the azimuth angle related to the angle A. **(05 Marks)**

3 a. Calculate for a free of 12 GHz, el = 22° for the horizontal polarization used for the rain rate $R_{0.01}$ = 15mm/h, h_0 = 600m and h_R = 1500m. Calculate the rain attenuation. Give a_h = 0.0188 and b_h = 1.217. **(05 Marks)**
   b. Derive a suitable expression for $[CNR]_U$ and $[CNR]_D$ for a link budget calculation. **(07 Marks)**
   c. Discuss various space link design transmission losses. **(08 Marks)**

4 a. Briefly describe various units of transponder for a C band communication satellite, construct a wide band receiver. Discuss how the capacity of a transponder can be increased. **(08 Marks)**
   b. Describe various methods used for attitude control. **(06 Marks)**
   c. With neat block diagram explain the role of TT and C. **(06 Marks)**

PART – B

5 a. Explain the role of indoor and outdoor unit in earth segment with neat block diagram explain the home terminal for DBS TV/FM reception. **(10 Marks)**
   b. With neat sketches explain the basic blocks of transmit receive earth station. **(10 Marks)**

6 a. EIRP from Sat_1= is 30 dBW, G_R is 44 dB in desired direction and 25.67dB towards interfering satellite. The interfering satellite also radiates an EIRP of 34dBW. The polarization discrimination is 4dB. EIRP from ES is 24 dBW, ANT gain is 55dB and neigbhour sat. txit at 30 dBW. The off axis gain in the Sat_1 direction is 25.67 dB.
   Polarization discrimination is 4 dB. Calculate $\left[\dfrac{C}{I}\right]_{ant}$. **(04 Marks)**
   b. Illustrate basic TDMA concept. Explain the basic equipment block of TDMA and frame and burst formats for a TDMA system. **(08 Marks)**
   c. With neat sketch, explain the principle of operation of channel assignment of a transponder and its traffic for a preassigned FDMA system. **(08 Marks)**