

**SHRI SANT GADGE BABA COLLEGE OF ENGINEERING & TECHNOLOGY, BHUSAWAL**

**Department of Electronics & Communication Engineering.**

**SUBJECT: SATELLITE COMMUNICATION**

**Class: - BE (E&C)**

**ASSIGNMENT NO. 01**

- 1) Explain various types of orbital perturbations affecting the system.
- 2) Explain briefly what is meant by sun transit outage.
- 3) Explain briefly Doppler effect.
- 4) Explain Launching of geostationary satellite in brief.
- 5) Explain in detail Sun-synchronous orbit.

**ASSIGNMENT NO. 02**

- 1) What is meant by rain rate and effective path length? The earth station attitude is 600m, elevation angle is 50, rain height is 3 km find the slant height, effective path length and horizontal projection of slant height.
- 2) Explain how depolarization is caused by ionosphere rain and ice.
- 3) Explain briefly parabolic reflector and also describe briefly the offset feed used with paraboloidal reflector antenna
- 4) Explain in brief the antenna configurations used for satellite communication system.
- 5) Explain various types of atmospheric losses what is cross polarization.

**ASSIGNMENT NO. 03**

- 1) What are the factors considered for uplink and downlink design. What is the significance of FM improvement factor.
- 2) Explain the CDMA technique used in satellite communication system.
- 3) Explain with the help of appropriate diagram “Time division multiple access technique” used in digital satellite communication. What is the role of unique word? How is it used?
- 4) Discuss the various design issues related with uplink design and give the Expression C/N ratio for the same.
- 5) A 4 GHz receiver has the following parameters  $T_{\text{antenna}} = 25\text{K}$ ,  $T_{\text{RF amplifier}} = 50\text{ K}$ ,  $T_{\text{IF amplifier}} = 1000\text{ K}$ ,  $T_{\text{mixer}} = 500\text{K}$ ,  $G_{\text{RF amplifier}} = 23\text{ dB}$ ,  $G_{\text{IF amplifier}} = 30\text{ dB}$

- A) Calculate  $T_S$  for  $G_{\text{mixer}} = 0\text{dB}$ .
- B) Calculate  $T_S$  for  $G_{\text{mixer}} = 10\text{dB}$ .
- C) If the above system has LNA with a gain of 50 dB and lossy waveguide with an automation of 2 dB is inserted between antenna and RF amplifier, find  $T_S$  for a waveguide temperature of  $300^0\text{K}$ .

**ASSIGNMENT NO. 04**

- 1) What is transponder? Explain with a neat diagram working of a basic transponder.? What are the function of front end receiver.?
- 2) Explain telemetry, tracking and command system.
- 3) What are the main consideration in the design of an earth station.? Explain general configuration of an earth station.
- 4) Explain with a neat diagram Transponder limiting in brief
- 5) Explain in brief satellite signal processing

**ASSIGNMENT NO. 05**

- 1) Explain INTELSAT & INSAT series, in details.
- 2) What are the types of non-geostationary satellite orbits and explain their advantages and disadvantages.
- 3) Explain the use of satellite in remote sensing applications in details.
- 4) How video conferencing is possible using a satellite? Explain with proper sketch.
- 5) Write a short note on VSAT and GPS.
- 6) Explain DBS satellite system.