

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0313

Roll No.

B. Tech.

(SEM. VII) ODD SEMESTER THEORY EXAMINATION  
2010-11

## SATELLITE COMMUNICATION

Time : 3 Hours

Total Marks : 100

Note : Attempt all the questions.

1. Attempt any four parts :— (5×4=20)
- (a) Explain different types of antenna used in Satellite Communication.
  - (b) What is the optimum G/T ratio for a standard earth station ?
  - (c) What are the factors that affect the uplink and downlink design ?
  - (d) Write short note on :
    - (i) Look, azimuths, elevation angle
    - (ii) Satellite axis.
  - (e) The semimajor and the semiminor axis of an elliptical satellite orbit are 20,000 km and 1600 km respectively. Determine the apogee and perigee distance.
  - (f) Explain geostationary satellite.

2. Attempt any four parts :— (5×4=20)

- (a) Derive general link equation. Find out expression for C/N and G/T ratio.
- (b) Discuss the antenna requirements for large and small earth station.
- (c) What are the various interferences that may affect the satellite link performance? Explain.
- (d) Two amplifiers are connected in cascades having a gain of 20 dB each. If the noise temperature is 200 K, determine the overall gain.
- (e) The EIRP of a 240W transponder is 57 dBW. Calculate the approximate gain of the antenna if the transponder is switched to 120W, calculate the new [EIRP], assuming that the same antenna is used.
- (f) Explain TT and C subsystem briefly.

3. Attempt any two parts :— (2×10=20)

- (a) In a digital transmission  $E_b/N_0 = 11\text{dB}$  for a polar NRZ transmission over BPSK. The system uses 8 bits per level. Calculate the S/N ratio in dB with a block diagram, explain a typical PCM/TDM system.
- (b) What is function of Demand Assignment control in DAMA system? Explain various such control systems.
- (c) What is the difference between multiplexing and multiple access techniques? What is TDMA super frame? Explain its structure.

4. Attempt any two parts :— (2×10=20)

- (a) Describe the Rain and ice effects on propagation.
- (b) The generator matrix for a (6, 3) block code is shown below. Obtain all code of words of their code.

$$G = \begin{bmatrix} 1 & 0 & 0 & : & 0 & 1 & 1 \\ 0 & 1 & 0 & : & 1 & 0 & 1 \\ 0 & 0 & 1 & : & 1 & 1 & 0 \end{bmatrix}$$

- (c) The parity check matrix of a (7, 4) linear block code is expressed as :

$$H = \begin{bmatrix} 1 & 1 & 1 & 0 & : & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & : & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & : & 0 & 0 & 1 \end{bmatrix}$$

Obtain the generator matrix (G) and list of all code vectors.

5. Attempt any two parts :— (2×10=20)

- (a) Explain DBS home receiver with block diagram.
- (b) State and explain the various segments of GPS system.
- (c) Write short note on any two :
  - (i) VSAT
  - (ii) LEO satellites for internet transmission
  - (iii) Non Geo-stationary satellites.

