

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

PAPER ID : 2894 Roll No.

**B. Tech.**

(SEM. VIII) THEORY EXAMINATION 2011-12

**SATELLITE COMMUNICATION**

Time : 3 Hours

Total Marks : 100

- Note :— (1) Attempt *all* questions.  
(2) All questions carry equal marks.

1. Attempt any *four* parts :— (4×5=20)
- (a) Explain Geostationary Orbit and satellite axis in brief.
  - (b) Write short note on look angle and orbit determination.
  - (c) The semi major and semi minor axis of an elliptical satellite orbit are 20,000 km and 1600 km respectively. Determine the apogee and perigee distance.
  - (d) What are the factors that affect the uplink and downlink design of satellite communication ?
  - (e) Write short note on different types of antennas used in satellite communication.
  - (f) Write short note on launch vehicles used in satellite communication.
2. Attempt any *four* parts :— (4×5=20)
- (a) Derive general link equation. Find out expression for  $\frac{C}{N}$  and  $\frac{G}{T}$  ratio.

- (b) What are the various interferences that may affect the satellite link performance ?
- (c) Two amplifiers are connected in cascades having a gain of 20 dB each. If the noise temperature is 200 K, determine the overall gain.
- (d) Discuss the antenna requirements for large and small earth stations.
- (e) The EIRP of a 240 W transponder is 57 dBw. Calculate the approximate gain of the antenna if the transponder is switched to 120 W, calculate the new EIRP assuming that the same antenna is used.
- (f) Explain TT and C system briefly.
3. Attempt any *two* parts :— (2×10=20)
- (a) Explain the need of modulation. Explain different types of modulation used in satellite communication.
- (b) What is difference between multiplexing and multiple access techniques ? What is TDMA super frame ? Explain its structure.
- (c) Explain pre-emphasis and de-emphasis in detail. Why it is required ? Explain with neat and clean diagram.
4. Attempt any *two* parts :— (2×10=20)
- (a) Describe the Rain and Ice effects on propagation in satellite communication.
- (b) Explain linear and cyclic block codes in detail.

- (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) State and explain various segments of GPS system.
- (b) Write a short note on VSAT.
- (c) Explain LEO satellite in brief. Write a short note on GPS.