Printed Pages—3 EEC069

(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.