PAPER ID

B. Tech.

(SEM. VII) (ODD SEM.) EXAMINATION, 2009-10

SATELLITE COMMUNICATION
(ELECTIVE - II)

Time : 3 Hours] [Total Marks : 100

Note : *Attempt* ***all*** *the questions.* ***All*** *carry* ***equal*** *marks.*

1 Attempt any **four** part of the following : 5×4=20

(a) Discuss the advantage and disadvantage of the 6/4 GHz band use in satellite communication.

(b) Prove that for covering the globe three communication satellites are sufficient.

(c) Determine the equation of satellite orbit.

(d) Explain the following with respect to satellite :

(i) Look, azimuth and elevation angles

(ii) Satellite axis.

(e) Explain the effect of non-spherical shape of earth on mean motion and orbit period of satellite.

(f) A geostationary satellite moving in an equatorial circular orbit is at a height of 35786 km from the earth surface. If the radius of the earth is 6378 km. Determine the theoretical maximum coverage angle and maximum slant range.

2 Attempt any **two** parts of the following : **10×2=20**

(a) Draw the block diagram of satellite showing various subsystem. Explain the function of orbit and attitude control subsystem in detail.

(b) Derive the general link equation. Find out the expression for C/N, system noise temperature on G/T ratio.

(c) What is meant by frequency reuse ? Explain with diagram the functions of transponder in communication subsystem of a satellite.

3 Attempt any **two** parts of the following : **10×2=20**

(a) What are the different digital modulation techniques and which is mostly used in digital satellite ? How FM provides S/N improvement at output of receiver ? Explain.

(b) Explain following with reference to TDMA :

(i) Frame structure

(ii) Frame efficiency

(iii) Super frame

(iv) Frame synchronization

(v) Probability of false detection.

(c) Explain DSSS, FHSS and THSS spread spectrum technique of CDMA.

4 Attempt any **two** parts of the following : **10×2=20**

(a) Compare linear block codes, cyclic code and convolution codes by giving their advantage and disadvantage. The generator matrix for a (6, 3) block code is shown below. Obtain first three code word of this code.

$$G=\left[\begin{array}{ccc:ccc} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{array}\right]$$

(b) Explain SAM anc CCIR model to calculate attenuation caused by rain in satellite wave propagation.

(c) What are the techniques can be used to reduce the propagation effects in satellite communication? Explain in detail.

5 Attempt any **two** parts of the following : **10×2=20**

(a) Draw the block diagram of DBS-TV receiver and explain the function of each block in detail.

(b) Write short notes on VSAT and Non-geostationary satellite.

(c) Explain in detail the GPS position location principles.
