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RM-7081-R

B. E. - III (Sem. VI) (ECC) Examination

May / June – 2010

Satellite Communication

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 3 (Sem. 6) (ECC)**

Name of the Subject :

☛ **Satellite Communication**

☛ Subject Code No. : **7 0 8 1** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) All symbols and abbreviations have their usual meaning.

(3) Attempt **all** the questions.

(4) Figures on the **right** indicate **full** marks.

(5) Assume necessary data whenever required.

(6) Draw figure whenever it is necessary.

(7) Write both the sections in separate answer sheet.

SECTION - I

1 (a) Do as directed : **10**

(i) Define the following : **5**

(a) Inclination

(b) Retrograde orbit

(c) Apogee

(d) Argument of perigee

(e) Epoch.

(ii) Calculate the altitude of geo-stationary orbit. **3**

(iii) Determine which of the following are leap years : **2**

(a) 1987

(b) 1991

(c) 2000

(d) 2010

(b) Explain Kepler's 2nd and 3rd laws with suitable diagram. **5**

(c) Describe the frequency allocation to satellite services. **5**

2 (a) Explain what is meant by **8**

(i) antenna noise temperature

(ii) amplifier noise temperature

(iii) system noise temperature.

(b) The following parameters apply to a satellite downlink : **7**

Saturation (EIRP) = 22.5 d BW.

Free-space loss = 195 dB

Other losses and margins = 1.5 dB

Earth station (G/T) = 37.5 dB/K

Calcualte the [C/No] at the earth station. Assuming an output backoff of 6 dB is applied, what is the new value of [C/No]?

OR

2 (a) Define and explain the terms roll, pitch and yaw. **4**

(b) Describe the east-west and north-south station keeping maneuvers required in satellite station keeping. **6**

(c) The EIRP from a satellite is 49.4 dBW. Calculate **5**

(i) the power density at a ground station for which the range is 40,000 km

(ii) The power delivered to a matched load at the ground station receiver if the antenna gain is 50 dB.

The downlink frequency is 4 GHz.

3 Attempt any **three** : **15**

(i) Antenna misalignment losses and effects of rain in transmission loss.

(ii) Sun-synchronous orbit

(iii) The wideband receiver

(iv) The input demultiplexer

(v) Input and output back-off.

SECTION - II

4 (a) Find out true/false : **5**

(i) When all the events are equally likely the average uncertainty must have largest value.

(ii) The more information a message contains the less work we have to do to transmit it from one point to another.

(iii) The main purpose of coding is to improve the BER.

(iv) Hard decision decoding is a way of decoding where we minimize the probability of error.

(v) The major difference between DBS TV and Conventional TV is that with DBS FM is used whereas with conventional TV AM is used.

(b) A (6,3) code is generated according to generator matrix. **5**

The receiver receives r = 100011. Determine the corresponding data word if the channel is BSC and the maximum likelihood decision is used.

(c) Define the following terms : **10**

(i) Preamble

(ii) BCW

(iii) TTY

(iv) VOW

(v) SC

5 Give answer to the following :

(a) Derive the expression of Miss probability. **7**

(b) Design the code tree to generate the convolution code for the digits 11010. **8**

OR

(a) Consider a (7,4) block code for which the parity matrix is given as, **7**

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

Find all the code words of the above code.

(b) Draw and explain the Pre assign TDMA. **8**

6 Write short notes on any **three** : **15**

(i) Master antenna TV

(ii) MSAT

(iii) GPS

(iv) Channeling arrangement for Intelsat SCPC system.