



RM-7081

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

May / June - 2010

Satellite Communication

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दशांशवैध निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
B. E. - 3 (Sem. 6) (ECC)	<input type="text"/>
Name of the Subject :	<input type="text"/>
Satellite Communication	<input type="text"/>
Subject Code No. : <input type="text"/> 7 <input type="text"/> 0 <input type="text"/> 8 <input type="text"/> 1	Section No. (1, 2,.....): <input type="text"/> 1&2
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 7
- downlink :
- 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
- Calculate 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 **5**
matrix.
- 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.
