



RE-7081-7082

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

April / May - 2007

Satellite Communication

Time : 3 Hours]

[Total Marks : 100

RE-7081

Instructions :

(1)

नीचे दशविवेक निशानीवाणी विगतो उत्तरवही पर अवश्य लખवी.

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

Seat No. :

Seat number input boxes

Student's Signature

- (2) Attempt all questions.
- (3) Figures to the right indicate full marks.
- (4) Assume necessary data wherever necessary and mention them.

1 (a) Answer the following question :

10

- (1) Suggest reasons, why the 14/12 GHz band has been selected for direct to home satellite broadcasting.
- (2) Explain what is meant by the line of apsides.
- (3) What do you mean by a transponder ?
- (4) In satellite - communication, classify the "Traffic".
- (5) An antenna has a gain of 46 dB at 12 GHz. Calculate it's effective area.
- (6) The noise factor of an amplifier is 7:1. Calculate the noise figure.
- (7) What is the function of the burst-code in a TDMA burst ?
- (8) What do you mean by single-access mode of operation in relation to the satellite - communication ?
- (9) Explain what is meant by frequency division multiple access and show how this differs from frequency division multiplexing.
- (10) List out the services provided by the satellites.

- (b) With the aid of a neat sketch, explain what is meant by each of the angles : inclination, argument of perigee, right ascension of the ascending node. Which of these angles would you expect, in general to change with time ?
- 2 (a) In satellite communication, for a constant EIRP the received power is independent of frequency of operation—Justify.
- (b) Distinguish between preassigned and demand assigned traffic in relation to a satellite - communication network explain the preassigned operations done in FDMA digital satellite system.

OR

- (b) How the burst position acquisition is achieved using feedback timing control in TDMA digital satellite system.
- (c) Determine the miss probability and the probability of false detection for the following values :

$$N := 40, E := 5, P := 10^{-3}$$

OR

- (c) Calculate the frame efficiency for an intelsat frame given the following information :

Total frame length = 1,20,832 symbols

Traffic bursts per frame = 14

Reference bursts per frame = 2

Guard interval = 103 symbols

Preamble symbols = 280

CDC channel and reference channel symbols = 288

- 3 Briefly discuss the following any **three** :
- (1) Kepler's three laws of planetary motion
- (2) Noise temperature of absorptive networks
- (3) Digital speech interpolation
- (4) Frame and burst formats for a TDMA system

# RE-7082

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Name of the Examination :

**B. E. 3 (Sem. 6) ECC**

Name of the Subject :

**Satellite Communication**

Subject Code No. :

**7 0 8 2**

Section No. (1, 2,.....) :

**2**

Seat No. :

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Student's Signature

- Attempt all questions.  
Figures to the right indicate full marks.  
Assume necessary data wherever necessary and mention them.  
Scientific calculators casio FX - 82/83 and equivalent are allowed.

- (a) Do as directed : (one mark each) **10**
- (1) Spin stabilization and gravity gradient stabilization are example of \_\_\_\_\_ attitude control.
  - (2) Define broadcast.
  - (3) What do you mean by redundant receiver ?
  - (4) Define multideestination carrier.
  - (5) MRTS service is a mobile dispatch service true or false.
  - (6) List some of the short comings of present day VSAT systems.
  - (7) The GPS system is one way or two-way transmission ? Why ?
  - (8) Define DPSK.
  - (9) What do you mean by entropy.
  - (10) Parity bits are used for \_\_\_\_\_.
- (b) Describe and compare the master antenna TV system **10** and the community antenna TV system.
- (a) Briefly describe three axis method of satellite stabilization. **7**  
This method is active type or passive type attitude control.  
Justify.

- (b) A zero memory source emits six messages with probabilities 0.3, 0.25, 0.15, 0.12, 0.1 and 0.08. Find the 4-ary (quaternary) Huffman code. Determine the average word length, efficiency and the redundancy.

OR

- 5 (a) Explain DPSK system with necessary block diagrams.  
 (b) Consider a (7, 4) block code for which the parity matrix is given as

$$[H] = \begin{bmatrix} 1110 & 100 \\ 1101 & 010 \\ 1011 & 001 \end{bmatrix}$$

Find all the code words of the above code.

- 6 (a) State the main reasons why the KU band is used for DBS services rather than the C band. Also explain DBS services in detail.  
 (b) Explain channel capacity of a discrete memory less channel and derive the expression

$$CS = \max_{P(x_i)} \pm (x, y) \text{ bi} + j \text{ per second}$$

OR

- 6 (a) Discuss briefly the need for MSAT system and explain how this compares with existing terrestrial cellular networks  
 (b) Explain the encoding of cyclic codes.