

314326

25226

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Use of Non-programmable Electronic Pocket Calculator is permissible.
(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : 10
- a) Define the terms –
 - i) bit rate
 - ii) Baud rate
 - b) State the sampling theorem and Nyquist rate.
 - c) List the digital modulation schemes.
 - d) State the types of multiplexing techniques.
 - e) State applications of spread spectrum modulation.
 - f) Why QPSK is better than BPSK ?
 - g) Explain the following terms.
 - i) Channel capacity
 - ii) Entropy

P.T.O.

2. Attempt any THREE of the following : 12

- a) State Hartley's Law and Shannon Hartley's theorem.
- b) Describe slope overload and granular noise in DM system.
- c) Describe FHSS system in detail with block diagram of transmitter.
- d) Compare TDMA and CDMA on the basis of following points
 - i) Guard band
 - ii) Guard time
 - iii) Codeword
 - iv) Synchronization

3. Attempt any THREE of the following : 12

- a) Explain the generation of BFSK signal with the help of block diagram.
- b) compare DSSS and FHSS system with respect to –
 - i) Definition
 - ii) Chip rate
 - iii) Modulation technique used
 - iv) Effect of fading
- c) Write any four specification of T-carrier system.
- d) Find the Nyquist rate and Nyquist interval for each of the following signals $x(t) = 5 \cos 1000 \pi t \cos 4000 \pi t$.

4. Attempt any THREE of the following : 12

- a) State BW required for BASK, BPSK. Also draw waveforms for binary data 10110010 in ASK; PSK modulation.
- b) Draw the block diagram of DPSK transmitter and explain.
- c) List the advantages of SS modulation over the fixed frequency modulation.
- d) Draw block diagram of PN sequence generator using 4 D flip flop.
- e) Generate the hamming code for the data (11001001)

5. Attempt any TWO of the following :**12**

- a) Draw data format for bit stream (10100101)
 - i) Manchester
 - ii) Polar Quaternary
 - iii) Bipolar RZ
 - iv) Unipolar RZ
 - v) AMI
 - vi) Unipolar NRZ
- b) Explain the working of CRC generator and checker.
- c) Draw the (a) Block diagram of QAM transmitter (b) Constellation diagram of 8 QAM.

6. Attempt any TWO of the following :**12**

- a) Justify that in DPCM system, less number of bits are transmitted than PCM system with the help of block diagram and relevant waveform.
 - b) Compare digital pulse modulation with analog pulse modulation (6 points)
 - c) Draw and explain block diagram of time division multiplexing (TDM) and state its advantages (Minimum 2)
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