

S.Y. Diploma : Sem. IV
[ET/EN/EX/EJ]
Data Communication Systems
Prelim Question Paper



Time: 3 Hrs.]

[Marks : 70

- Instructions :** (1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Preferably, write the answers in sequential order.

1. Attempt any **FIVE** of the following : [10]
(a) Define entropy and state its unit.
(b) State Shannon Hartley theorem.
(c) State sampling theorem.
(d) List different types of multiplexing techniques.
(e) State advantages of digital communication system.
(f) List the applications of spread spectrum modulation.
(g) Explain fast frequency hopping with diagram.
2. Attempt any **THREE** of the following : [12]
(a) Explain quantization errors in DM and methods to avoid them.
(b) Draw the block schematic of PCM transmitter. Explain the same with waveform.
(c) Encode the following Binary data stream into unipolar RZ, unipolar NRZ, AMI and split phase Manchester code Data stream : 10110100101.
(d) Draw the DPSK transmitter and outline its working principle.
3. Attempt any **THREE** of the following : [12]
(a) With the help of neat sketch explain quantization process.
(b) Generate CRC code for data 1101010011 when the divisor is 01011
(c) Draw block diagram of DPCM transmitter and receiver.
(d) Draw and explain QPSK generator with waveform.
4. Attempt any **THREE** of the following : [12]
(a) Explain hamming code for 1 bit error detection with example for data 1101.
(b) Draw neat diagram of CCITT digital multiplexing hierarchy and explain in brief.
(c) Compare ASK & FSK
(d) Draw and explain BFSK transmitter.
(e) Draw block diagram of QAM generation system and explain it with waveform.
5. Attempt any **TWO** of the following : [12]
(a) The probabilities of five source messages are $m_1 = 0.2$, $m_2 = 0.3$, $m_3 = 0.2$, $m_4 = 0.15$ and $m_5 = 0.15$.
(i) Generate Huffman codes for the given source.
(ii) Find the coding efficiency for Huffman coding.
(b) Interpret the steps to convert digital signal into analog signal using QPSK modulation with suitable block diagram.
(c) Draw the circuit diagram of PN sequence generator for generating PN sequences of length 15. Assuming initial contents of the shift register, to be all ones, explain its working. Generate the output sequence.
6. Attempt any **TWO** of the following : [12]
(a) Describe DS-SS technique with block diagram in detail.
(b) Describe basic principle involved in CDMA technology with neat sketch and states its four advantages.
(c) Explain quantization process in detail with waveforms.

Paper Discussion Schedule for: S.Y. Diploma Sem.-IV

Date	Day	Timing	Centre
21 April 2019	Sunday	11 a.m. to 1 p.m.	Borivali
21 April 2019	Sunday	9 a.m. to 11 p.m.	Thane