Code No: RT32043          **R13**          SET - 1

**III B. Tech II Semester Supplementary Examinations, November - 2018**
## DIGITAL COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 hours                                        Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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## PART –A

| | | | |
|---|---|---|---|
| 1 | a) | Define quantization noise. | [3M] |
| | b) | Draw the BASK waveform for the data **1 0 1 1 1 0 1 0 1**, using bipolar signaling. | [4M] |
| | c) | Give the expression for minimum probability of error of a matched filter. | [3M] |
| | d) | Define i) Information ii) Information rate. | [4M] |
| | e) | What is the tradeoff between bandwidth and SNR. | [4M] |
| | f) | List different types of channel codes. | [4M] |

## PART -B

2 a) Find a signal $g(t)$ that is band-limited to $B$ Hz and whose samples are [8M]
$$g(0) = 1 \ and \ g(\pm T_s) = g(\pm 2T_s) = g(\pm 3T_s) = \cdots = 0$$
where the sampling interval $T_s$ is the Nyquist interval for $g(t)$, that is, $T_s = \frac{1}{2B}$.

b) Draw the block diagram of PCM system and explain.          [8M]

3 a) Draw the block diagram of coherent binary PSK detector and explain its operation.     [8M]

b) Explain the process of differential encoding and detection of binary DPSK with the     [8M]
following data: [1 0 1 0 0 1 1 1 0 0].

4 a) Plot and compare the probability of error for the non-coherent detection of binary     [8M]
ASK and binary FSK.

b) Explain the operation of integrate-and-dump filter.          [8M]

5 a) A memoryless source emits 0.3, 0.25, 0.15, 0.12, 0.1, and 0.08. Find the entropy of     [8M]
this source.

b) Define the following:          [8M]
i) Amount of information
ii) Average information
iii) Mutual information
iv) Information rate

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6  a)  A source emits seven messages with probabilities 1/2, 1/4, 1/8, 1/16, 1/32, 1/64,   [8M]
        and 1/64, respectively.  Obtain the Huffman code and find the average length of the
        codeword.
   b)  Write notes on Shanon-Fano coding.                                                   [8M]

7  a)  The decoding table for the single-error correcting (7, 4) code is given in Table.    [8M]
        Determine the data vectors transmitted for the following received vectors *r* :
        i) 1101101
        ii) 0101000
        iii) 0001100

| *e* | *s* |
|---------|-----|
| 1000000 | 110 |
| 0100000 | 011 |
| 0010000 | 111 |
| 0001000 | 101 |
| 0000100 | 100 |
| 0000010 | 010 |
| 0000001 | 001 |

   b)  Write notes on Viterbi algorithm.                                                    [8M]

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