Code No: R1631044 **R16** SET - 1

III B. Tech I Semester Supplementary Examinations, October/November - 2020

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. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A (14 Marks)

1. a) Discuss the different noise effects in Delta Modulation. [2M]
   b) Explain the non-coherent detection of binary FSK signals. [2M]
   c) Compare a correlator and matched filter. [2M]
   d) Calculate the amount of information if binary digits occur with an equal likelihood in binary PCM systems. [3M]
   e) What are discrete memoryless channels? [3M]
   f) Explain about BCH codes. [2M]

PART –B (56 Marks)

2. a) Explain quantization error and derive an expression for maximum SNR in a PCM system that uses linear quantization. [7M]
   b) In a binary PCM system, the output signal to quantizing noise ratio is to be held to a minimum value of 40dB. Determine the number of levels and find the corresponding signal to quantizing noise ratio. [7M]

3. a) Explain how the integrator is used to detect the baseband signal? Obtain an expression for S/N of integrator and dump receiver. [7M]
   b) Obtain the probability of error for a Matched filter. [7M]

4. a) Draw and explain the coherent system of signal reception. [7M]
   b) Binary data is transmitted over a telephone line with a usable bandwidth of 2400 Hz using the FSK signaling scheme. The transmit frequencies are 2025 Hz and 2225 Hz, and the data rate is 300 bits/sec. The average signal to noise power ratio at the output of the channel is 6 dB. Calculate the Probability of error for the coherent and non-coherent demodulation schemes. [7M]

5. a) Explain the concept of entropy and its properties. [7M]
   b) An analog signal band-limited to 10 kHz is quantized in 8 levels of a PCM system with probabilities of 1/4, 1/5, 1/5, 1/10, 1/10, 1/20, 1/20, and 1/20 respectively. Calculate the entropy and the rate of information. [7M]
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6. a) Discuss in brief about continuous channel capacity. [7M]
   b) Calculate the capacity of the discrete channel shown in Fig.1. Assume r_s=1 symbol/sec. [7M]

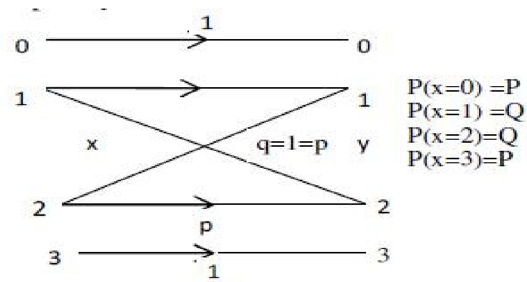

Fig -1

7. a) Explain the sequential decoding of convolutional codes with one example. [7M]
   b) Draw the state diagram, tree diagram, and trellis diagram for k=3, rate 1/3 code generated by $g_1(x) = 1+x^2$, $g_2(x) = 1+x$ and $g_3(x) = 1+x+x^2$. [7M]

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